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Triptych

for flute, clarinet, baritone saxophone, percussion and live electronics

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by

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Dedication

To Alma, with love.

Acknowledgements

As I wrap up my doctoral study, I must take a glance back down the proverbial mountain and thank a few folks. First off, my sincerest gratitude goes out to the University of Texas composition faculty. Their guidance, encouragement and inspiration has allowed me to grow as a composer, scholar, educator and human being. In particular, Russell Pinkston has shown me that it is possible to be a technological wizard, a great composer, and a supportive mentor all at once. Bruce Pennycook has inspired me to pursue a wide range of multimedia collaborations and career connections; Yevgeniy Sharlat has demonstrated the value of short score reductions, a deep knowledge of the canon, and a mordant wit; and Dan Welcher has given me a fantastic model of prolific composition and professional engagement toward which to aspire. I am grateful as well for my conversations with architecture professor Michael Benedikt, and his strong commitment to interdisciplinary partnership. Lastly, I would like to thank my parents, who put me on this earth and have nurtured my development throughout my life, and my brother Abe, who introduced me to music and pretty much everything else.

Triptych
for flute, clarinet, baritone saxophone, percussion and live electronics

Ethan Frederick Greene, D.M.A.
The University of Texas at Austin, 2013

Supervisor: Russell Pinkston

Triptych is a thirty-minute work in three movements for flute, clarinet, baritone saxophone, percussion and live electronics. Rhythmically intricate musical "tessellations" are juxtaposed with long, evolving drones amidst an electronic backdrop of environmental found sound, granular clouds, procedurally generated rhythmic sequences, and simple oscillators. The piece examines conceptions of pattern, pitch and period in the environment, highlighting the musical elements and structures of creatures and machines – the "almost-human" musical beings all around us. Each "panel" of the triptych is designed to work effectively as either a part of the larger work, or as its own, autonomous piece of music. The electronics are designed to maximize performability and improvisatory flexibility in the ensemble. All processing and cueing is coded in Max/MSP. *Triptych* was commissioned by the Fountain City Ensemble, and will be premiered in March, 2014.

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Chapter 1: Background and Approach

1.1 Introduction

During the course of my study at the University of Texas at Austin (2009-present), I have composed for a wide array of ensembles and media: small and large instrumental ensembles; opera and art song; interactive electroacoustic music and fixed media; score and sound design for film, television and video games. I have explored diverse musical elements in my compositions, from rigorous gestural music (or at least my attempt at it), to minimalism, to sound art, to straight-up pop music. I've always considered myself an eclecticist, a tinkerer, a jack of all trades (but hopefully a master of more than none), while harboring the hope that one day I would find a unique combination that I could call My Personal Style. I believe I have found this combination. At the very least, I have found something I can stick with for a while.

Before I discuss this stylistic approach in *Triptych*, there is the all important question of "Why this medium?" The short answer is that I received a commission from the Fountain City Ensemble right around the time I was beginning to think about my dissertation. Two birds with one stone later, *Triptych* emerges. However, my decision to write this piece at this moment was more than the result of simple providence.

I've always been intrigued by the combination of woodwinds and percussion. The range of sound envelopes and colors available to the composer – short attacks, long drones, and everything in between – is dizzying. Indeed, one has access to the full gamut of Denis Smalley's "morphological models" (Smalley, 70), shown below (Fig. 1.1). In

addition, the ensemble is perfect for electroacoustic interaction. Each instrument is capable of producing, and, perhaps more importantly, *controlling* sounds all along the "note-to-noise continuum" (Ibid, 65). Lastly, while I have written for solo and duo with electronics, I've never "electrified" a larger ensemble. So I jumped at the opportunity to spend a year working with this odd quartet and interactive electronics.

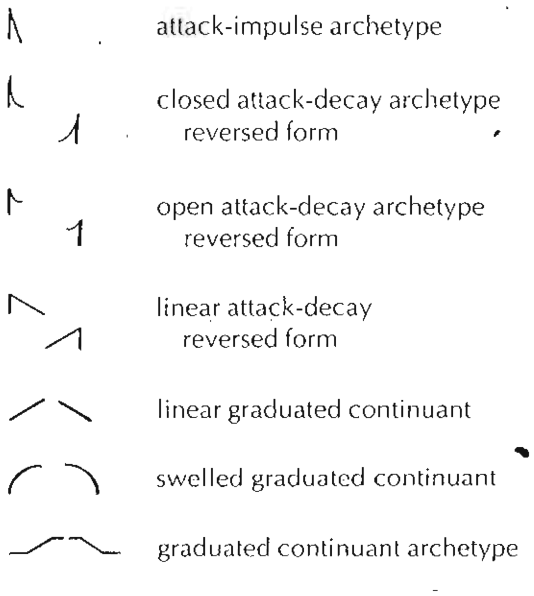


Figure 3: Morphological models

Fig. 1.1: Smalley's "Morphological Models." (Smalley, 70).

1.2 General Style and Approach

This is a music of restraint. Virtuosic writing and individual flourishes are, by and large, eschewed in favor of controlled, interlocking gestures, and repetitive, evolving textures. My general approach in *Triptych* is to present the ensemble as a unified entity. Each member of the group performs as part of a larger whole – a worker in a union, to

take the Andriessenian view – rather than as soloist, accompanist, background, foreground, adornment, or any other individualistic agency role. In other words, no instrument stands dominant or subordinate to any other, and development occurs via the evolving intricacies of the ensemble's interactions.

Most of the motives in *Triptych* are drawn from the rhythms, periods and pitch patterns of creatures and machines in the world around us. In the first movement, the coquí frog, a mellifluous singing frog native to Puerto Rico, is highlighted. The second movement, more of a "drone" piece, is centered around, and at times "conducted" by swarms of singing cicadas. In the third movement, antiquated machine sounds – dial-up modems and dot-matrix printers – contain the seeds for motivic ideas. In simplified terms, the ensemble is performing with an "environmental accompaniment," whose material also serves as a wellspring for motivic content.

The development of motives largely occurs by processes of rhythm, with space – the adding and removing of rests – as a central tool in establishing and subverting expectations. Motor rhythms are frequent, and melodies are mostly angular and disjointed. Motives are repeated and developed by gradual modification techniques such as additive and subtractive processes, key-signature transformations (a la Hook, which will be explained later), phasing and overlap.

The harmonic language of the piece can best be described as "quasi-diatonic." There are tonal centers throughout *Triptych*, but these can be thought of more as "axes" than as true key areas. While tendencies do emerge along the lines of functional tonality, "wrong notes" and pop-oriented progressions and ostinati often subvert this tonality. In

addition, generally diatonic patterns are often accompanied by independent, seemingly unrelated bass lines. This technique may spring from my life-long love of hip-hop, wherein samples are often accompanied by unrelated sounds to form odd composite tracks that are tied together by dominating bass lines and rhythmic backbeats.

Because of the relative lack of individual virtuosity in the piece, it may demand somewhat less individual practice time than other contemporary works. However, it will be difficult to perform accurately without extensive ensemble rehearsal time. The electronics are often designed to bolster the ensemble in sections of complex interlocking patterns, but also create an additional layer of rehearsal difficulty – audio system issues, playback, monitoring, etc. Thus, it is advised that the ensemble devote significant rehearsal time to the piece (as always), and integrate the electronics as much as possible before performance.

1.3 Influences

My interest in art music began in college, when a friend burned me a disc of Steve Reich's *Music for 18 Musicians*. I had been composing jazz, rock and hip-hop – though the term "composing" would have been questionable to me at the time – for several years, and had been feeling the urge to branch out. After studying the Mingus Big Band compositions, I moved from bop and blues to a more intricate form of jazz composition. Subsequently, when I heard Cecil Taylor and Ornette Coleman, I decided to disgard structure as a whole, and really went "out." My fascination with *18 Musicians* brought me back to structure and long-form design, though, and once I saw Reich's score, I

decided to switch majors (I was a Biology major at the time), and put my pencil to the paper as an Official Composer of "high brow" music.

Over the past 12 years since then, I have explored many different styles, but my work has always been couched in a fundamental penchant for minimalist processes, as well as a die-hard connection to popular styles. In this piece, I feel that for the first time, I have settled on a style that truly blends these two influences. It is an amalgamation of much of the restrained, repetitive music of the twentieth and twenty-first century art music tradition, containing elements of Reich, Andriessen, Torke and Lang, as well as older models such as Stravinsky, Janacek, and, of course, their stylistic forebears.

For me, Andriessen stood out in particular as a model to emulate. Everett writes of Andriessen's intent in his compositions during the 1970's: "He empowered musicians to make choices in performances, incorporated gestures to create a sense of collective solidarity, and tried to eliminate the boundary between 'low' and 'high' art by dividing instruments into collective, egalitarian musical forces" (Everett, 66). My work has always contained some attempt to eliminate the boundary between low and high, and over the past several years, has seen a natural reigning-in of excess. In many ways, it has taken much of my nascent compositional career to come back to Andriessen, who was one of the first composers of art music I admired.

The influence of hip-hop is another important part of my recent work. As mentioned earlier, this is manifest through the incorporation of disparate bass line elements, unexpected sample-like sounds, and backbeat structures. Unbeknownst to me until my recent research, this marks another similarity between my work and

Andriessen's. According to Robert Fink, for Andriessen, "Radical left-wing politics would validate fusing the rigour of early minimalism with the 'progressive' dissonance of European modernism; the resulting mixture would itself be validated by reference to the rhythmic complexity and raw countercultural power of African-American popular music" (Fink, 546). Whereas Andriessen was channeling free jazz and rhythm and blues, I grew up with hip-hop, and, thus, am influenced by the production of such DJs as Large Professor and DJ Premier, to name a couple.

The Bang On A Can collective and the totalist movement follows as a natural influence on my music. In Fink's article, the following discussion of Michael Gordon's *Trance* rings particularly apropos in the discussion of *Triptych*: "Gordon himself makes the analogy between the 'independent interlocking units going on simultaneously' and musical information overload: 'all the different thoughts in one's head that go on – like being able to hear all the music that's going on everywhere in the world, in one's head, at the same time'" (Fink, 546). This idea of "interlocking units" is fundamental to my style in *Triptych*. I would say, however, that I am less interested in combining all of the units at one time than I am in drawing parallels between adjacent units, and in establishing dialectical relationships between them.

The "drone music" and "ambient" genres were also a big influence in the development of this piece. David Behrman's *On the Other Ocean* factored strongly in my decision to incorporate a great deal of extended, evolving music with simple waveforms and improvisatory ensemble elements into the piece. *On the Other Ocean* is a 24 minute piece for flute, bassoon and microcomputer-controlled oscillators. The score is simply a

collection of six pitches – a pentatonic scale (with octave) – and directions to take one's time. In the album notes, Behrman remarks, "Hearing 'On the Other Ocean' now, nineteen years later, I'm astonished about how unflappably unhurried we were. Nobody and no institution was going to make us hurry our music along. We loved pure tones and we were going to listen to them for a long time, no matter what" (Behrman). The piece is a wash of sound, a soothing flow of time, and for me, a constant reminder to slow down. For several weeks, I listened to this piece every morning, and can safely say that the introduction and entire second movement of *Triptych* are the result of this obsession.

Messiaen's *Quartet for the End of Time* (1946) served as a model for the interaction between instruments of the ensemble in *Triptych*. Aside from the fact that the Fountain City Ensemble has always struck me as a distorted version of the *Quatour* ensemble – in fact, I hope to one day prepare an arrangement of Messiaen's masterpiece for the ensemble – Messiaen's work has always been a major influence on my composition. His modes of limited transposition, as well as his writings on rhythmic techniques, have served to order this piece. In addition, *Danse de la fureur, pour les sept trompettes* influenced my decision to present many of the rhythmically complex motives of the piece in unison or octaves.

Finally, the music of Russell Pinkston has had a profound influence on my work. In his electroacoustic compositions, Pinkston demonstrates a remarkable balance between technological prowess and musicality – *i.e.*, successful development of melody, harmony and rhythm (a.k.a. "music") – that, in my opinion, is rather elusive within the dominant electroacoustic music community today. In works for woodwinds and Max/MSP such as

Lizamander, *Gobo*, and *e++*, Pinkston blends concrète material, synthesis, and live processing with refined instrumental writing to create a challenging and satisfying experience for both listener *and* performer. This is a true feat, and one I aspire to in *Triptych*.

1.4 Triptych as Organizing Principle

A triptych is a picture in three panels, usually consisting of one large central image, flanked by two smaller images. Triptychs were produced as far back as antiquity, but the earliest extant examples are from Byzantine era (12th century) Rome and Tuscany. These triptychs were primarily religious icons, consisting of the Holy Trinity and related symbolism. The outer panels, often on hinges, could be closed or opened depending on the liturgical calendar (Schmidt).

The triptych form and compositional style was adopted in Germany and the Netherlands in the 14th century, and expanded in scope through the 17th century. Triptychs were produced to depict religious and historical scenes, portraits of saints, narrative stories and as memorials for the dead. The triptych reached its 17th century pinnacle with the works of Rubens (Fig. 1.2), and fell out of favor in the 18th century. Triptychs were revived in the 19th century by Nazarene and Pre-Raphaelite painters, as well as by the Naturalists and Symbolists, and continue to be used today (Ibid).

Fig. 1.2: Peter Paul Rubens, *Raising of the Cross* (Grove Art Online).

Today, the central panel is often the largest image, but the tripartite form seems to be the only standardized convention. Francis Bacon's 28 known triptychs from the mid-twentieth century, for instance, consist primarily of three equal-sized rectangular panels (Ibid). Probably his most famous triptych, *Three Studies for Head of George Dyer* (1964), is shown below. Note the autonomy of each image; the three pictures obviously go together, but could arguably be presented just as effectively as separate paintings.

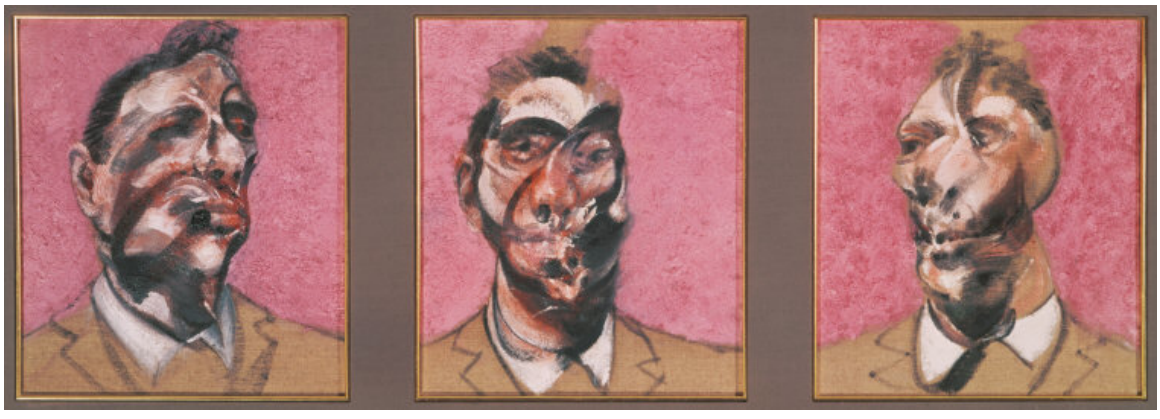


Fig. 1.3: Francis Bacon, *Three Studies for Head of George Dyer* (Grove Art Online).

The triptych has since been adopted in other art forms, with many musical works using this title throughout the 19th, 20th and 21st centuries. Some of the better known triptychs in Western art music include Respighi's "Trittico Botticelliano," Puccini's "Il Trittico" and Hindemith's "Symphony" Mathis der Maler," based on Mathias Grünewald's triptych "The Temptation of St. Anthony." Three more recent examples include William Schumann's "New England Triptych" (1944) for symphonic orchestra, Roxy Music's "Triptych" (from 'Country Music,' 1974), and Robert Sirota's "Triptych" (2004) for string quartet, commemorating the victims of the attacks on September 11, 2001. Perhaps it is favored for its religious connotations, or perhaps for its tidy, tripartite structure, but it has clearly had an appeal to composers over the past three centuries.

Doubtless both of these appealed to me in my use of the term. However, it was the possibility for each panel to exist as either an individual work, or as a part of the greater whole (as in the Bacon above), that proved most attractive to me. In setting out to write the piece, I wanted to create a substantial, long-form work – indeed, this is my longest work of instrumental music – whose movements could each be presented individually with equal, or at least similar, musical impact. This would give the ensemble the option to program one movement, or, if they had the time to learn it, the technical resources to pull it off, and the space on a concert to program it, the whole piece. I do not believe I am selling the piece short by doing this, but rather, I am yielding to the realities of chamber music today.

Chapter 2: Methods

2.1 Improvisatory Elements and Environmental Rhythm

Each movement of *Triptych* begins with an improvisatory "initiating sequence." In these sequences, defined barlines, rests, and precise tempi are avoided in order to foster a more fluid sense of time. In the first movement, the woodwinds are instructed to play repeated staccatissimo pitches, ascending and descending in density. The pitches are given in boxes, and each new synthesizer pitch signals the introduction of new pitches in the instruments. Aside from the instruction to remain out of synchrony with the other instruments, various stylistic parameters – dynamics, register (in certain cases), timbre, etc. – are left to the performer. Amidst a background wash of undulating tam-tam rolls in the percussion part, this sequence – the longest initiating sequence, and, perhaps an introductory movement *sui generis* (with attaca leading into I.) – serves to introduce the "environmental rhythm" concept that underlies the entire work.

Environmental rhythm is an idea I first developed in constructing *Environmental Rhythm Etude No. 1*, which was largely an effort to explore sounds I wanted to use for *Triptych*. *Environmental Rhythm Etude* is governed by the undulating intensity of a recording of cicadas in a field, and is comprised of various evolving beds of granular synthesis. The cicada undulations move at approximately 46 beats per minute, with subtle variations that amount to a sort of "environmental rubato." I also explored this sort of rubato in my piece, *For Candles* (2011), which used the almost-metronomic dripping of wax from horizontally-suspended candles (over piezo-electric contact microphones) to

build textures and chorale-like pitch sequences. Much of the cicada material from *Environmental Rhythm Etude* is repurposed in the second movement of *Triptych*.

In the third movement, the initiating sequence (mm. 1-7) gives the ensemble more agency over the progress of the electronics. Each press of the MIDI pedal advances to the next measure's held-chord-followed-by-rhythmic-gesture segment. In this way, the ensemble is able to provide greater expression and individuality to each measure's statement than if it were interacting with a fixed media element. This is the only initiating sequence that features substantial processing. Each held chord is granulated to create a sustained bed behind the fixed elements. In order to precisely time the gradual ramp-up of granular processing, the MIDI pedal cue is delayed until after each percussion statement. This somewhat restricts the time allowed for the held chords, but is preferable to excessive pedal cues (see below for more discussion of electronic practicalities).

The dramaturgy that results from these initiating sequences is a progression of human ideas framed by a more environmental time flow. Each idea progresses in an organic fashion, with notes added, removed or changed by gradual processes, but is couched in a more fundamental, nonhuman sense of time. The idea here is to reflect that the human perception and expression of time is informed by the abstract musical elements innate to environmental systems. The human portrayal of patterns is the foundation of music and language, but it emerged from the environmental portrayal of such patterns. It is the goal of this work to create a synthesis of these two portrayals.

2.2 On Composing for Ensemble and Electronics

Composing for instruments and electronics is a process wrought with pitfalls. Over the past three years, I have written three electroacoustic works with performers: *Flying Fish* (2011), for trombone, violin and live electronics; *Sewn* (2012), for percussion trio and fixed media; and *Lissajous* (2013), for vibraphone and live electronics. Throughout this process, I have learned about the myriad choices one must make in constructing a work that combines electronic sound and live performers. I have learned that even *within* an electroacoustic work, different sections can demand different technologies, different delivery methods for electronic sound. Whereas one section might work well with fixed media, another section might demand live processing, pitch tracking, or some other interactive element. At times it can feel like one is composing for several different ensembles within the same piece; if as though one is writing a piece that begins for full orchestra and ends for steel drum ensemble.

On a basic level, composing a successful interactive work is no different from composing an acoustic ensemble work: it is largely a matter of balancing musical and practical considerations. A process based on musical considerations alone – *i.e.* composing without concern for performability – can result in a work that is either impossible to perform, or devoid of any satisfaction for the performers (or, of course, both). On the other side, an overly practical process can strip the music of its natural course of development, and saddle the piece with clunky, alien elements. I call this sort of errant approach "telegraphing the interaction" between electronics and performers. Such telegraphing occurs when a composer chooses to include sounds, rhythms, motives or

other elements that wouldn't otherwise fit within the piece, solely in order to make it easier for the performer to follow the electronic part. It would be the equivalent of giving quarter notes to the snare drum for an entire piece (in a non-minimalist work) in order to make it easier for the orchestra to stay together.

Many composers choose to solve this problem by providing the performers with a click track. I have never done this, and I hope I never will. Why not? Elizabeth McNutt, a flutist and advocate for electroacoustic music, encapsulates the performer's perspective on this with great eloquence in her piece, "Performing electroacoustic music: a wider view of interactivity" in *Organised Sound*:

> Sometimes a click-track will be made to assist the performer. This generally improves the coordination between live and recorded parts, but adds to the burden of prosthesis the performer carries, and can be musically unsatisfying. Consider how few musicians enjoy practising with a metronome; fewer still like performing with one. Using a click track also emphasises the reactive, rather than interactive, situation of the piece. Focused on accurately following the click, the performer is less able to inflect her timbres to suit the accompaniment, or to keep up the illusion of interactivity in other ways. (McNutt, 300)

I would add that this would be especially true in the context of an ensemble work such as *Triptych*. Much of the power and beauty of chamber music derives from the simple spectacle of multiple musicians performing together without a conductor. There is a collective unity that is fundamentally impressive to an audience here, and a click track would undermine this unity. Especially when composing for an ensemble that plays together regularly (Fountain City Ensemble), it is the composer's duty to tap into this unity.

In her article, McNutt continues to discuss the range of techniques used by composers to add flexibility and expressive potential to electroacoustic works with performers. She begins with a rather scathing criticism of "tape" accompaniment: "For the player, performing with fixed accompaniment is like working with the worst human accompanist imaginable: inconsiderate, inflexible, unresponsive and utterly deaf" (Ibid, 299). It is for this reason that I have never written a true instrument-with-fixed media piece. The closest I've come is *Sewn* (2012), for percussion trio and electronics. This piece, written for *line upon line* percussion, is a spatial work – the percussionists are asked to perform at various locations throughout the work, and to move around the space as the piece progresses – and thus, demanded a somewhat reduced technical scope. However, rather than simply create a fixed media accompaniment, I broke the "tape" part into several sections, and asked the performers to play them on an iPod or other portable device (connected to the house audio system). Even though there ended up being only four audio files, this technique provided the ensemble with much greater flexibility, and allowed *line upon line* to perform the piece dozens of times, at venues with less than stellar audio systems across the country.

In *Flying Fish*, I built a much more involved system of electroacoustic interaction, using Max/MSP software (and my new-found facility with coding). Because Steven Parker and Molly Emerman, the duo that commissioned the piece, own their own high-quality clip-on microphones, I chose to process their input quite heavily, using delay lines, distortion and channel-specific pitch-tracking to control various synthesis processes. I began composing the piece thinking I would limit myself to the instrumental

input signal as my only source material – a common misstep among composers at similar stages, I've since found – but soon realized that I would need to include some fixed media elements in order to really accomplish my compositional goals. So, I built a system where MIDI pedal cues changed the state of the processing machine, but also triggered sound files.

This system became the model for the Max/MSP engine in *Lissajous*. In this piece, since vibraphone is a much less directionally focused input source, I decided to scale back my processing of live input, and focused a little more heavily on fixed media elements. I also incorporated highly rhythmic elements that were not controlled by the performer. This, I believe, was a bit of a mistake. In performance, I noticed discomfort and lack of expression on the part of the performer during this section – even after much practice and performance – and as a result, decided to use a more "friendly" system in *Triptych* during most rhythmic portions. This will be discussed in greater detail below.

In conclusion, when working with electronics and performers, it is the composer's job to make the piece performable, challenging and satisfying for the ensemble, without sacrificing his or her compositional intent. Of course, this is the case with any type of piece, but it is of particular interest in developing new ensembles, as the electroacoustic composer is charged with doing each time he or she embarks on a new piece.

2.3 Electronic Methodology

Various electronic elements and processes were used in the creation of *Triptych*. I will describe the most common processes here. The software required to run the piece

was developed in Max/MSP, a graphical programming language for real-time synthesis and audio processing, originally written by Miller Puckette and distributed by Cycling '74 since 1999. The Max/MSP "patch" for this piece contains all digital signal processing modules (including input and output handling), as well as event scheduling and cue control for the performers. In the score, "pedal cues" – which are somewhat minimal and tentative at this point, but will be solidified – refer to an ordered series of "states" that are triggered by a MIDI pedal, intended to be operated by one of the performers (or the composer, if present). All fixed media elements were developed and assembled in Apple's Logic software.

Granular synthesis and processing are used prominently throughout *Triptych*. First developed by Denis Gabor in the late 1940's, granular theory is based on the concept that sound is perceived simultaneously in the frequency and time domains, and thus, can be dissected in short bursts of energy, or grains, rather than via separate time or frequency domain operations. Because grains can still be played back at the same rate after pitch shifting, granular synthesis is a popular means of pitch and time shifting. Xenakis was the first (known) composer to incorporate granular synthesis into his work, using grains of synthesized material in early tape works such as *Analogique B* (1958). Other landmark pieces using granular synthesis are Barry Truax's *RiverRun* (1986) and Paul Lansky's *Idle Chatter* (1985) (Dodge, 262-71).

In *Triptych*, granular synthesis is used in a number of ways, and on both fixed media and live sources. Each of the major environmental sound sources – insect, animal and machine sounds – is granulated at some point during the piece. That is, the sound is

broken down into tiny individual grains, usually between 10 and 500 ms long, each of which is controlled by an envelope generator. Next, the grains are played back at varying rates, with fixed or randomized delay times between grains, and pitch shifting is applied to individual grains. In *Triptych*, granular synthesis is also frequently applied on the input signal (particularly during the second and third movements), and sent through delay lines in order to create granular "clouds." More on this will be explained below. MacPOD software was used to create much of the granular elements in the fixed media portions of the piece.

Additive and subtractive synthesis are also used heavily throughout *Triptych*. In the drone sections, simple waveforms (sine, sawtooth, rectangle) are combined using TAL's "Noisemaker" software, as well as Max/MSP's internal oscillators. The purity of these tones sets them apart as foils to the complex timbral combinations in the ensemble during the introductory sections of each movement, a technique stolen wholesale from David Behrman. Subtractive synthesis is the primary means for creating "blips" and other percussive sounds in the rhythmic portions of the piece. The rhythm generator units (described in more detail below), are comprised of individual impulses and short, noisy sound files, sent through resonant bandpass filters in Max/MSP. These filters, often tuned to the tonal center of sections (particularly in movement I.), are designed to occupy the nebulous space between "real" and "synthesized" sound, as well as to bridge the gap between the percussion and woodwind sounds.

Lastly, envelope-following is used frequently throughout the piece in order to process input sources and to control the gain of fixed sounds. I have come to recognize

envelope-following potential as one of the main arguments for using an interactive software such as Max/MSP or Supercollider, rather than a DAW (aside from financial arguments). In *Triptych*, I have designed a system that tracks the input gain of the instruments, and uses this gain to play back various soundfiles as accompaniment to the instrumental sound. In addition, I use input gain to control the delay time of granular synthesizer units at various points throughout the piece. The result of this, heard most prominently in movement II, is a granular texture that speeds up (becomes more active) when the instrumental input gain or the gain of the environmental found sound – cicadas, in this case – ramps up, and slows down as it ramps down. Less common electronic processes shall be described as they occur throughout the following analysis.

Chapter 3: Complete Analysis

3.1 Introduction

Structurally, the sections of *Triptych* can be broken down into two main types: long, improvisatory washes, or "drones" of sound, and steady, mechanical, more rhythmically elaborate portions. This main juxtaposition serves as an organizational theme throughout the work. In the rhythmically active and gestural sections of the piece, human concepts of pitch, pattern and period are *grafted on to* the associated musical elements in the environmental found-sound. In the less structured, improvisatory sections of the piece, the instruments are *controlled by* the abstract, semi-regular structure of these environmental sound patterns. These improvisatory sections include nontraditional notation such as graphic indications of density, "tangled knot" pitch figures and other chance elements, as well as extended techniques such as air-blowing and tongue rams. They are placed at the beginning of each movement in an attempt to focus the ensemble members' awareness of one another, as well as their awareness of the electronic sound.

The tripartite form of the piece is based on the triptych in visual art, as discussed above. In keeping with the conventional proportions of triptychs throughout history, the center movement is the longest. (*I.* is technically longer in duration, but includes a five-minute introduction that can be thought of as an introduction to the piece as a whole.) *I.* and *III.* are active and energetic movements, while *II.* is relaxed and meditative, focused around a slower environmental sense of time.

The electronic part serves various functions throughout the piece. In the introductory sections, it is largely comprised of fixed media, with MIDI pedal cues to trigger the playback of new sections. In order to make the first movement as technically performable as possible, I have chosen to exclude live processing here; a live-generated rhythm sequencer is the only non-fixed element in the first movement. The second movement, on the other hand, features fairly extensive live processing. In this movement, the ensemble's sound is melded into the fixed media elements through granular synthesis and envelope following, among other processes. In the third movement, the live sequencer returns, along with more live processing.

The following analysis will step through each section of each movement of the piece, for the purpose of presenting the narrative of *Triptych* in words.

3.2 Movement I. (Introduction)

The first movement begins with a roughly five-minute section that serves as an introduction for the piece as a whole. The woodwinds' improvisatory repeated staccato material, played with an oscillating pattern of densities, is presented on a bed of simple waveforms in the electronics and tam-tam rolls in the percussion part. The pitch content begins with the trichord A-C♯-D, and moves to G-C♯-D, then B-C♯-D, beginning an expansion outward to the heptachord D-A-B-C♯-E. The baritone saxophone line follows the electronics' introduction of new pitches, and serves as the conductor for the

ensemble. Thus, while the progression of this section should be improvisatory, the high woodwinds will need to follow the baritone saxophone to stay together.

The introduction continues its expansion to a new tonal area at the 3:35 point, introducing the B♭/E♭ axis. Major 7th chords dominate here, with the eventual goal of reaching a D-E-A-B♭ tetrachord. In this last section of the introduction, the pattern of improvisation begins to change in the flute and clarinet, and the baritone sax plays held notes. At 5:00, the instruments taper off, and the electronics introduce the sounds of the coquí frog.

Several models were considered in notating the opening section of the piece. First under consideration was precise rhythmic notation and feather beaming. This notation has the advantage of providing a clear sense of entrances, lengths and degree of overlap between instruments, but would not accurately reflect the fluid nature of the material. It would also require frequent verbal modifiers – *e.g.*, "Vary rhythms ad lib." or "Tempo rubato ad lib." – in order to allow for even a modicum of improvisatory freedom.

Next considered was graphic spatial notation, a la Tristan Murail's *Unanswered Questions* (see Fig. 3.1), in which metered passages alternate with precise duration indications. This would, perhaps, be an ideal choice for the material at hand, but would demand a great amount of space, and could get confusing for the performers. In my experience, spatial notation is somewhat more appropriate for solo music, as in the Murail example, or for music with a conductor, as in the early work of Krzysztof Penderecki (*De Natura Sonoris*, for one).

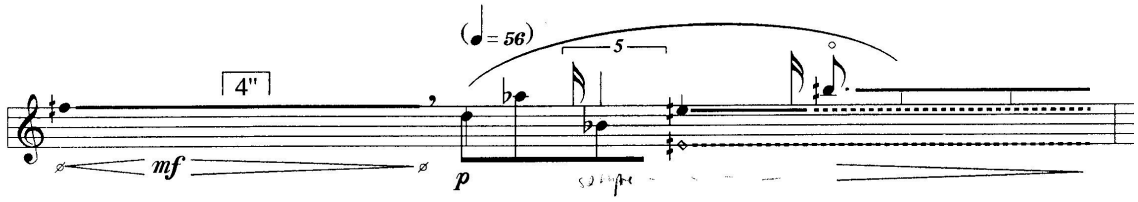


Fig. 3.1: Murail, *Unanswered Questions*, mm. 4-5.

Finally, a hybrid between spatial notation and aleatoric box notation was selected. This method allows for freedom of improvisation, while conveying a clear sense of when pitches are introduced. The downside of this approach is the requirement that the instrumentalists read off of the score for the introduction. However, this would have most likely been true with the other models as well. When performers are asked to interact so fluidly with each other, and no conductor is present, it is often the case that the full score must be included.

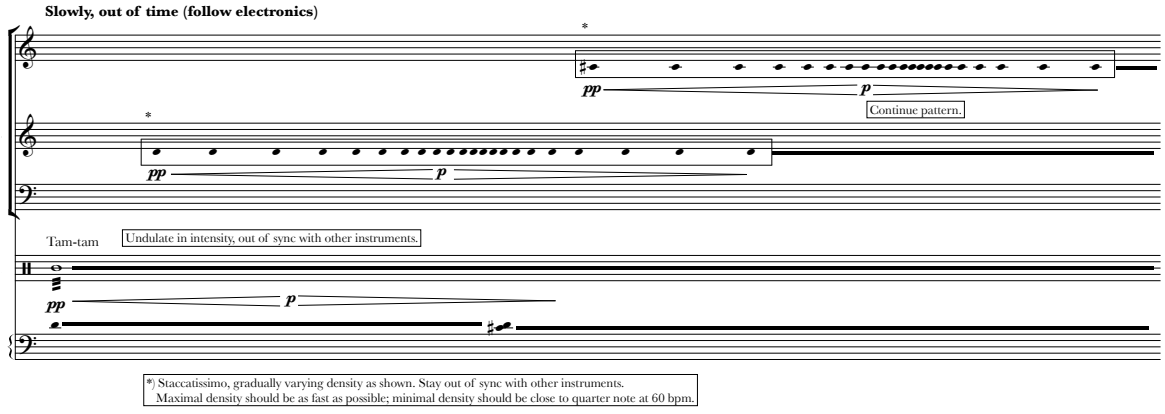


Fig. 3.2: First "initiating sequence," *I.*, m. 1.

3.3 Movement I. (Proper)

The coquí frog has fascinated me since I visited Puerto Rico in 2000. Native to the small commonwealth, and a recent colonizer of Hawaii, the coquí has a unique, two-pitch call that begins on a slightly sharp major 7th and bends up to an octave. I decided to use this wide-leaping gesture as the fundamental motive of the first movement. In m. 2, the baritone sax and marimba introduce it in G, while coquí frogs and jungle sounds are heard in the background. An archival recording from the Cornell Lab of Ornithology (Colón López, ML 53794) is isolated here using iZotope RX noise reduction software, and sent through granular processing to produce a jungle of coquís on various pitches. This solves the main musical problem of the coquí: they only sing on one pitch class.

Assembling the first main thematic section (mm. 2- 63) began with "composing the composite," and continued with fracturing and distributing the notes and rhythms to members of the ensemble. The composite figure appears in its complete form for the first time in m. 46, as shown here:

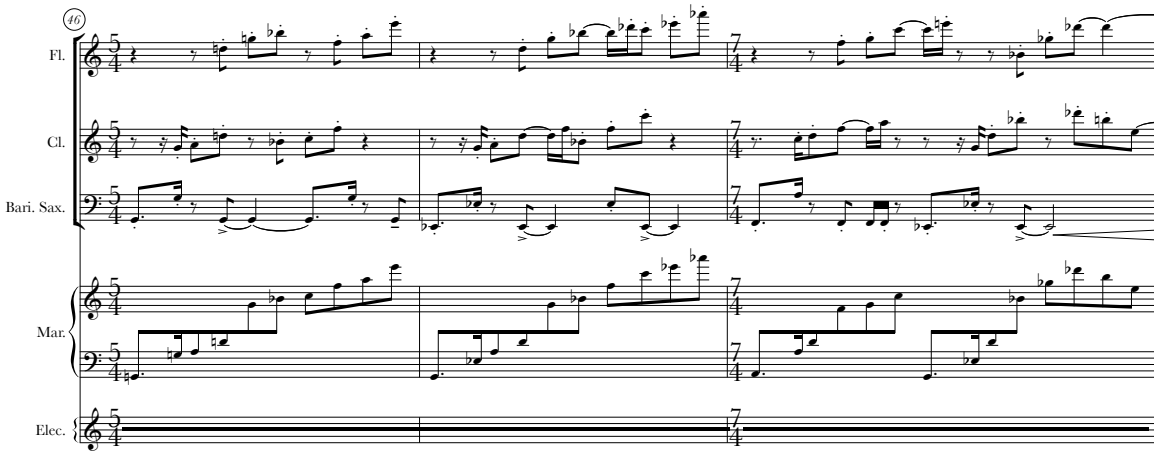


Fig. 3.3: Musical tessellation, *I.*, mm. 46-8.

The marimba plays the composite, but it is distributed in shorter segments to the three winds. As such, the marimba serves as a glue to hold the adjoining segments together. In this way, this section resembles a musical tessellation, not unlike those of M.C. Escher (Fig. 3.4). That is, each instrument's disjointed line could form its own melody, but when stated in the negative space of adjacent lines, a composite musical tessellation is formed.

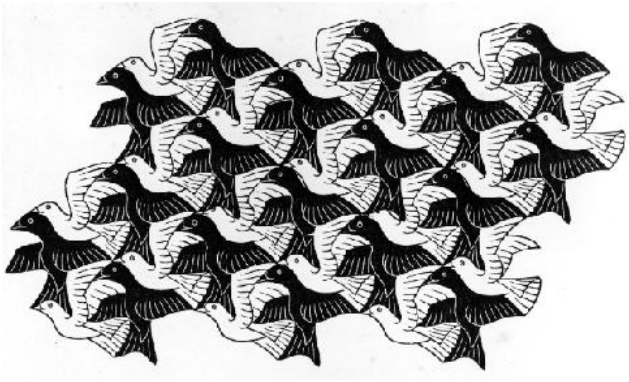


Fig. 3.4: M.C. Escher, *Regular Division of the Plane with birds* (mcescher.com).

This composite melody is assembled additively, and unlike a true visual tessellation, overlap is key in holding the whole together. In m. 8, the baritone sax continues its G-E♭-A-E♭ ostinato, and the clarinet follows, beginning on the last rhythmic value played by the saxophone. In m. 15, the flute enters, similarly dovetailing off of the clarinet. In m. 18, the flute passes the melody off to the clarinet again, creating a "leapfrogging" melody, and so on. The line is somewhat embellished, however, in the second and third measures of each three-measure phrase. These sixteenth note additions create a second layer of overlap behind the composite line.

In m. 25, the Rhythmic Blip Machine (RBM) is activated in the electronics. This unit is built from simple impulses (using the click~ object in Max/MSP), passed through tuned resonant filters (using the lores~ object). All simple subdivisions of the beat – whole note to 32nd note, as well as dotted notes and triplets on each subdivision – are available in this unit. In addition, a probability filter – *i.e.*, the percentage of blips that pass through – and a "humanization factor" – *i.e.*, the range of random delay, from 0. to the full subdivision length (1.) – is applied to each blip. Lastly, a table of pitches (in a coll object) is provided to determine the blip tunings. At this moment, the RBM is tuned to the tetrachord G-A-D-E♭. One important feature of the RBM is the "0" button. If the ensemble begins to drift from the beat, the user (the percussionist in this case) has the ability to press the space bar to reset the downbeat. My hope is that this will provide some degree of performance flexibility for the ensemble.

Once the RBM is activated, a short interlude, featuring coquí-like major-9th leaps in the flute and clarinet, is followed by a resumption and development of the main theme. The harmonic ostinato of G-E♭-A-E♭ continues with rhythmic and melodic variation. This variation occurs most notably via the obfuscation of the downbeat, as shown in the composite marimba line in mm. 34-7 (Fig. 3.5). This serves to disorient the hypermeter, and further develop the main theme.

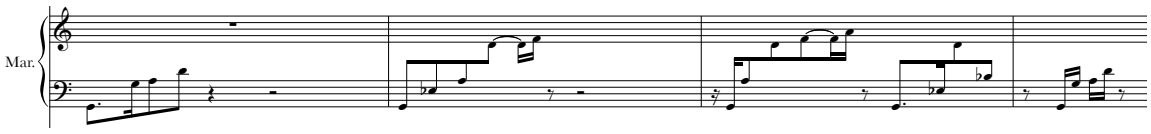


Fig. 3.5: Obfuscation of the downbeat, Marimba, *I.*, mm. 34-7.

In m. 64, the second thematic unit is introduced, once again with G as its tonal center. Instead of providing the composite line on the marimba, the percussion part now mirrors the repetitive flute and clarinet line on the wood blocks. This is the first significant instance of complex rhythmic lines performed by the woodwinds in unison, a technique that will feature more prominently in the third movement.

The third thematic unit is introduced in m. 86 with a center of B♭, faster yet and with marimba "glue" once again. The assembly of the composite is, like the first thematic unit, accomplished via "leapfrogging." In m. 102, the saxophone reenters after a brief breather, and the line is disjointed and skewed. The flute and marimba now play a quirky, insistent melody – the closest we've come to a true melody in the piece – above a pseudo-accompaniment distributed between the saxophone and clarinet. We remain in the tonal area of B♭, and gradually disintegrate toward the end (mm. 125-7).

In this section, an important element of the piece's musical language is introduced: the stuttering rhythm. A two-measure basic idea is presented in mm. 102-3, and repeated with slight rhythmic variation in mm. 104-5. At the end of m. 105, however, an extra beat is added before the final B, subverting the expectation of pulse and hypermeter:

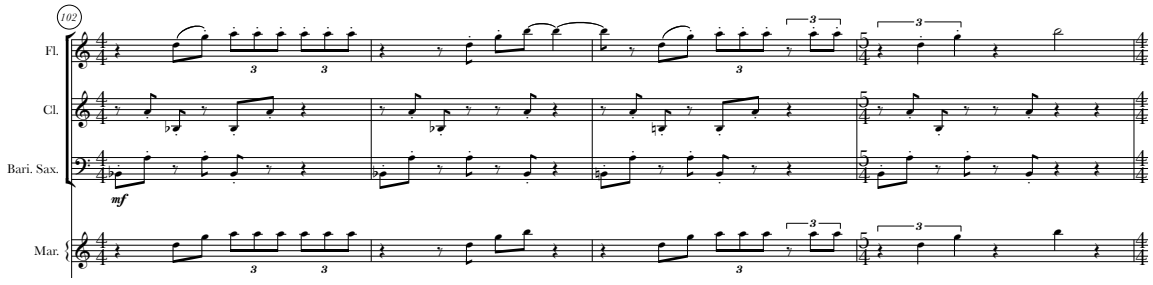


Fig. 3.6: Stuttering rhythm, *I.*, mm. 102-5.

In other words, in this technique, patterns are established and then altered slightly to keep the listener's interest. In this way, my style differs from that of the true minimalists: whereas Steve Reich would start a pattern and gradually vary it, I choose to break the pattern with slight rhythmic variation and added negative space.

The final section is a recap of the third thematic unit, faster and with accompaniment from the RBM, tuned to the pitch set B♭-D-E-F-G-A. The baritone sax, however, now provides a disparate bass line, firmly establishing an harmonic structure where there was ambiguity before. The flute line continues upward, adding whole-tone "wrong notes" at the end of phrases beginning with mm. 138-9, and the clarinet begins to tack on an extra note to its pattern in each measure. The 5/8-5/8-5/8-6/8 metric schema continues throughout, and the saxophone bass line drops out, replaced by a pedal G rhythm in m. 156. Lastly, the final 6/8 measure is repeated four times in true minimalist fashion, and the movement ends abruptly.

3.4 Movement II.

The second movement of *Triptych* begins with an initiating sequence (mm. 1-46) that is slightly more rigid in meter and measure, and dominated by "tangled knot" pitch figures. In these figures, each instrument is asked to play a cluster of pitches in any order, as fast as possible for the given duration (Fig. 3.7).

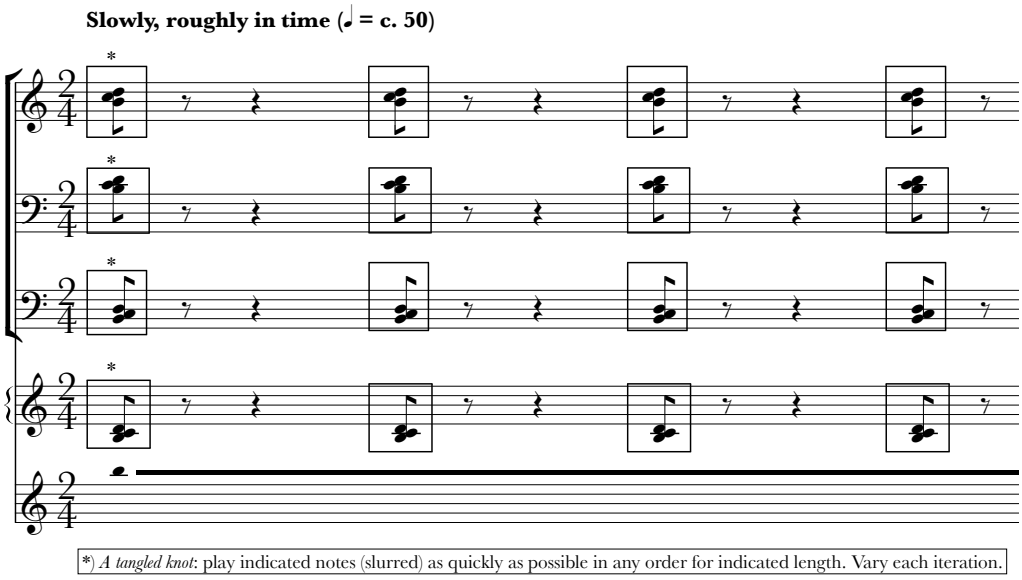


Fig. 3.7: Tangled knot figures, *II.*, mm. 1-4.

The intended result is a short jumble of pitches, a sonic representation of a tangled ball of yarn. The tempo should be somewhat steadier than in *I.* and *III.*'s respective initiating sequences, so meter and measure numbers are included. However, since precise attack and release points are left to the ensemble's discretion, bar lines are generally absent. 3/4 bar lines are only included for ease of reading and potential rehearsal points.

The style of this section can best be described as "Behrman meets Feldman." As in *I.*, drones of simple synthesized tones progress at an extremely slow rate, accompanying the improvisatory elements in the ensemble. Like much of the music of Morton Feldman, individual cells and motives in this section are repeated at a stuttering, not-quite-steady rate, with minor variations in rhythm and ordering. In this case, the stuttering is provided by the occasional 3/4 bars and quarter-note length, as well as being

inherent to the improvisatory nature of the section. In Feldman's case, on the other hand, this stuttering is brought about by precise metering and rhythmic variation. For example, in his piano piece *Palais de Mari*, Feldman uses extremely subtle variations in rhythm to alter simple, repeated gestures. The first six measures, shown in Fig. 3.8 below, outline this approach.

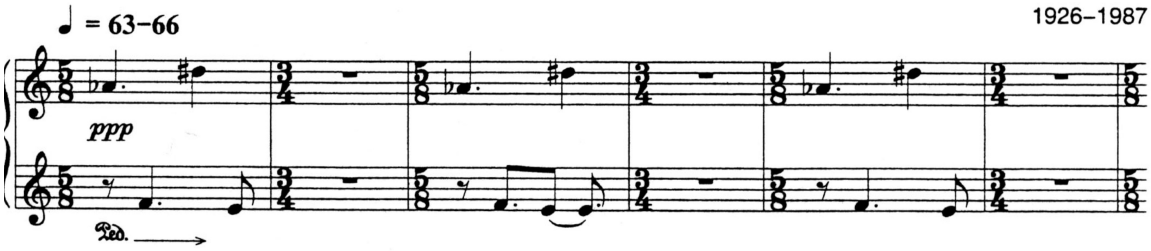


Fig. 3.8: Feldman, *Palais de Mari*, mm. 1-6.

Here, a tetrachord (A♭-F-D♯-E) is repeated monophonically (although with constant pedal) three times, with a slight variation – the F-E dyad is altered so that the E is played before the D♯ – the second time. This, along with the ever-depressed pedal, produces a sort of haze in memory to the listener (at least to *this* listener). The reordering appears as a kind of rhythmic mirage, as it is quickly erased on the third playing (m. 5), which is identical to the first.

The harmonic progression in this section of *Triptych* is a sequence of trichords and tetrachords, each changing one semitone at a time. The initial B-C-D trichord expands outward in register to a final G-C-F trichord in m. 46. Quartal harmony was chosen for its open and directionless sound, tonal in origin but full of contradictory

tendency tones. Furthermore, the combination of quartal harmony and pure tones can produce illusory harmonic partials and interesting electroacoustic blending effects.

At the end of the introduction, granular-processed trumpet and shofar sounds are introduced, emerging out of the quartal harmony in the woodwinds. Above this texture, the instruments are asked to improvise air sounds, key clicks and tongue pops and rams, which are sent through granular processing and delay. In addition, the intensity of sound in the microphone input controls the grain delay of yet another granular synthesizer, whose source is the same synthesizer used in the first movement introduction.

This improvisatory section tapers off, and a recording of a field of cicadas emerges. I spent some time in the field, recording humming cicadas, but eventually ended up using, with permission, an archival recording made by David C. Marshall, an ecologist and evolutionary biologist at the University of Connecticut. Rather than tie an approximate tempo to the cicada recordings, I have chosen to use their swells as the conductor. The performers are asked to follow these recordings, and use each swell as a measure marker (see Fig. 3.9). The cicadas begin at approximately ♩ = 46, but vary subtly throughout the recording; thus, it will take some practice for the ensemble to get comfortable following the swells. In addition, the performers are instructed to follow the dynamics of the cicadas, which I imagine would be one's natural instinct anyway.

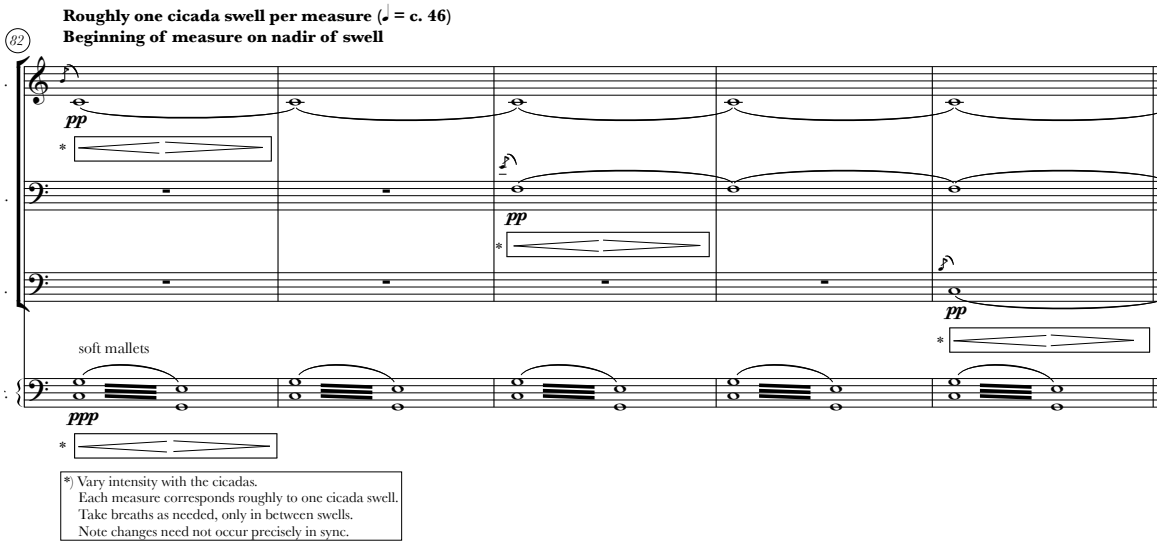


Fig. 3.9: Cicadas as "conductor," *II.*, mm. 82-6.

The idea for using cicadas as a tempo determinant came to me amidst the Great Cicada Craze of 2013. During the summer, the Brood II cicadas, which had been dormant for the preceding 17 years, were set to emerge and breed. Much was made on various news outlets about the significance of this emergence, and it became a fascination for me. I thought back to the summer days I spent in New Hampshire at camp, and remembered standing for what seemed like hours on the soccer field (I played goalie), listening to the cicadas thrum. Their pulsating rhythm – a slow, environmental rhythm, below the threshold of human patience and tempo perception – entranced me. So I decided to bring this trance to my music. Ideally, there would be more of a chance element to this segment of *Triptych*. Perhaps a future incarnation of the piece could be performed in a field at dusk, with the hordes of cicadas determining the tempo at that moment. But for the time

being, and for the sake of practicality and likelihood of future performance, I've chosen to use a recording.

In this section, the bass clarinet and baritone saxophone form an intentionally-muddy, subtly-varying ostinato pattern of long tones. The process here is quite simple: the clarinet proceeds steadily from F to F♯ to E, while the baritone saxophone cycles quasi-randomly through the chromatic pitches from A♯ to D. As such, almost all dyad combinations of the clarinet's trichord and the saxophone's heptachord are produced. Above this, the flute plays a long, aimless melody, somewhat similar to the saxophone's quasi-random semitone/tone meanderings. All the while, the marimba plays a low, rumbling C-major tremolo with soft mallets, creating an ever-present major wash behind the dissonant almost-canon in the winds.

In addition, throughout the section, grace-notes appear, creating quick leaps of 7ths and 9ths to the held pitches. This adds a twitching quality to the otherwise sedate sequence of long, slow pitches. It also ties the woodwinds' material to the insect world in the electronics, as the cicadas continue to rise in amplitude throughout. In m. 117, the instruments reach a widely spaced C-major chord, and the granular elements rise once again in the electronics. This wash of grains, tuned in quartal harmony once again, reaches a fever pitch and gradually diminishes over the course of the next several minutes. While the pace of the overall movement demands a lengthy coda – one to endow the large ABCB with suitably even proportions – this final section also gives the performers a moment of respite. In a 30-minute work, this will be sorely appreciated.

3.5 Movement III.

The third movement of *Triptych* begins with a more ordered initiating sequence. Instead of long drones, I have chosen a call-and-response structure, with electronic manipulation and another bout of pure tones serving to unite the two forces. The percussion begins each "call" with a crotale-strike, followed by a rapid chromatic xylophone "scamper." Each time this scamper occurs, two more pitches are added, until the entire 12-tone row is created (Fig. 3.10).

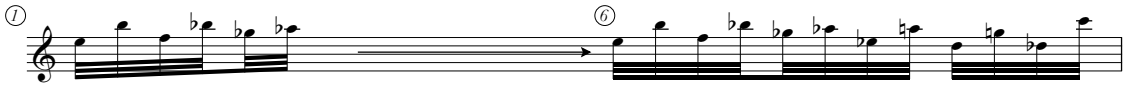


Fig. 3.10: Xylophone "scamper" development, *III.*, mm. 1-6.

Meanwhile, the winds respond to these calls with homophonic 9th chords. Barlines are mostly absent once again, in order to encourage experimentation with length and shape of held chords. Each time a new chord is introduced, a MIDI pedal cue initiates a ramping-up of the granular processing on the winds, serving to sustain the wind pitches in a cloud while the synthesizer tones fade in. A percussive electronic gesture – played as fixed media, and built from recordings of a plastic tube – mirrors the xylophone scamper, and concludes each electronic response.

This introduction is the only real instance of gestural music in the piece – *i.e.*, music where individual moments of sound are presented on their own, without a sustained, repetitive rhythmic or textural middle- or background. As such, it marks the third movement as a sort of new beginning, a passage into a new sound-world. This

world is one of machines, whose rhythms and pitches form a different kind of almost-human system of patterns.

The electronics are built on two sources here: dial-up modem and dot matrix printer recordings. Growing up in the ‘80s and ‘90s, these two machines provided much of the machine music around me. There is a triumphant feeling to both, an achievement that an unlikely connection has been made. In the case of dot-matrix printers, it was the triumph over the typewriter. After hearing my mom working on her legal writings every morning on the typewriter throughout my youth, our acquisition of a printer represented a major leap into the future. I remember sitting and listening to our printer for what seemed like hours, waiting for my middle school and high school papers to print, entranced by the steady, periodic thrumming that would, every so often, change slightly. And when my parents bought my brother and me ‘Music Construction Set’ software for the Atari 65XE, I was able to print my first attempt at sheet music (an arrangement of Herbie Hancock’s *Chameleon*).

The modem was another aural signifier of technological progress, as well as a major means of musical discovery for me in my teenage years. When my family first became blessed with Internet access in the late ‘90s, I used it primarily to download pirated music. So the iconic wash of white noise, followed by the metallic sixteenth-eighth-sixteenth rhythm of the dial-up modem, has always been a beautiful sound to me.

With this background in mind, I wanted to craft a movement that was driven by the natural rhythms and pitch material of these two machines. I began by finding recordings of modems and printers on the internet – in addition to my own sample

library, freesound.org was a valuable resource for this – and applying heavy noise reduction to weed out the ambient sound. Then I spliced each sound into dozens of rhythmic morsels, and began assembling them into motives. In addition, I fed the entire recording into a pitch-based sample synthesizer, and created a harmonic bed with the dial tone and modem pitches. This accounts for the primary harmonic material during the electronic solo in m. 7.

At the end of this solo, the synthesizer tones reemerge, and the marimba begins an incessant series of metronomic quarter-notes on B – an homage to Terry Riley's *In C*. The flute and clarinet enter in unison at m. 12, with an eight-pitch row [E-D♯-G-C♯-A-C-F-B] that begins with an ascending M7 and converges to a P5 (until the F-B). This row is repeated three times, with slightly off-kilter rhythms on each repetition. The phrase takes up 10 beats on the first statement (mm. 12-13), nine on the second (mm. 13-14), 8 on the third (mm. 15-16), and 7 on the fourth (mm. 18-19). In the last statement, D and B♭ are added at the end to complete the tritone E-B♭ axis, making this last phrase length actually 8 beats long. But the point remains: the row converges in interval space as well as in duration on each repetition (see Fig. 3.11).

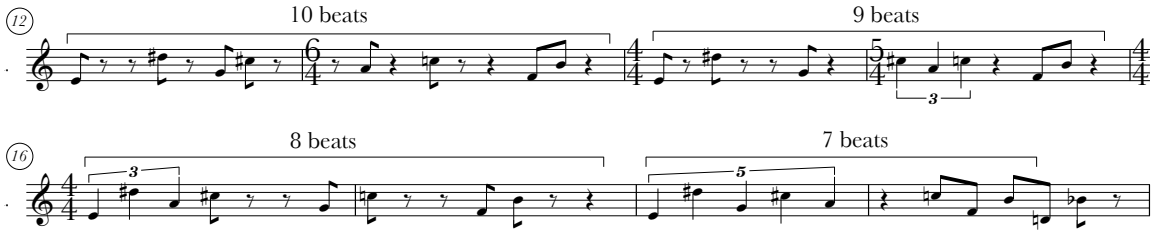


Fig. 3.11: Duration of theme repetitions, Flute and clarinet, *III.*, mm. 12-19.

This entire unit is then repeated almost identically, with the addition of a countermelody in the baritone saxophone. Each pitch in the upper voice is followed by a response on the next eighth note in the lower voice, creating a sort of skewed delay effect. All through this section, the marimba continues its Riley-esque quarter notes, which shift from strong beat to weak beat, due to the contracting phrase length. The last measure is elided with the next measure this time, and, thus, shortened to a 3/4 bar. In m. 28, the winds play a closing gesture that lands on a widely spaced F♯ major chord, and is immediately followed by the introduction of the rhythmic "modem beat" in the electronics.

This beat is constructed using the aforementioned rhythmic modem clips, along with synthesized "Risset drums" and the same tube samples that were used in the introduction. This drum synthesis is a technique that Jean-Claude Risset employed to create noise bands using random ring modulation. As described by Dodge, a fundamental frequency is added to this random ring modulation, along with inharmonic partials at 1.6, 2.2, and 2.3 times the fundamental.

This is the only rhythmic portion of the piece in which the ensemble does not have an override or "0" button. This is due to the heterogeneous nature of the sounds in this beat, and the changing meters. I wanted to make sure that each downbeat was distinguished in the electronics, and a random rhythm generator that allowed for resetting of the downbeat would not have been conducive to this sort of metric precision. Thus, the ensemble must listen closely in order to stay in rhythm with the track.

At this point, the clarinet breaks off to play an ascending eight-pitch scale [E-F-G-A-B-C-C♯-D♯] as a pseudo-harmonization to the main theme. As shown in Fig. 3.12, a sort of "fulcrum" results where the two instruments cross at C in mm. 32-33.

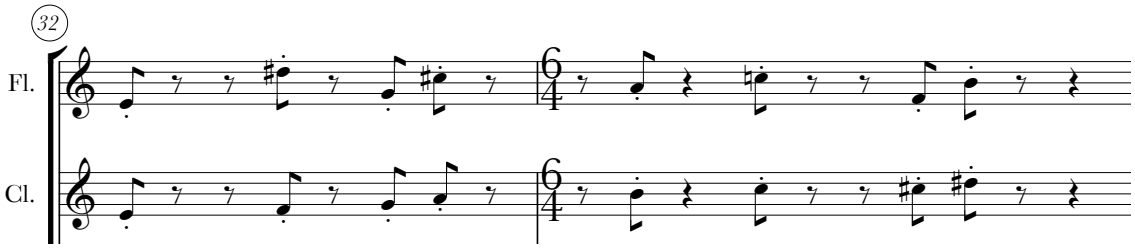


Fig. 3.12 Harmonization of the theme, Flute and clarinet, *III.*, mm. 32-3.

In m. 40, the entire segment is repeated, with the flute up an octave and the saxophone filling in more of the interstitial space with countermelody. In m. 48, the winds proceed to a short B section in F, while sixteenth note taps are introduced, and the Risset drums become more insistent in the electronics. The B section returns in m. 56, and continues to spiral upward to F♯ in m. 60 and, finally, G in m. 65. Finally the transposition of the theme descends back to F, beginning a new section in m. 69.

This marks the first time in the piece where slurred-note gestures reign supreme over pointillistic staccato textures or drone sections. A six-pitch, "serpentine motive" – [F-G-F♯-A♭-F-F♯-G-A♭], seen first in the clarinet (mm. 71-2) – dominates this entire formal unit (mm. 69-120). See Fig. 3.13 below for notational display of this motive. The flute and clarinet state call-and-response variations on this motive, accompanied by the saxophone and marimba on each first note, while the electronics explore overlapping

granulated dot-matrix printer textures. The clarinet and flute are joined by the saxophone in m. 81 in overlapping variations on the serpentine motive. These statements become more and more dovetailed until m. 91, when the tempo accelerates to ♩ = 120, and a new rhythm machine – the Tappy Rhythm Machine, a variation of the Rhythmic Blips Machine – is introduced.

The flute now repeats the serpentine motive over and over again, and is eventually joined by the clarinet (m. 96, starting on beat 3), the baritone saxophone (m. 97, beat 5), and finally the marimba (m. 99, beat 4). This begins a true minimalist process of phased lines, shown below (Fig. 3.13). In contrast to the work of Reich, however, the combination of quarter-note triplets and eighth notes here undermines the stability of the pulse.

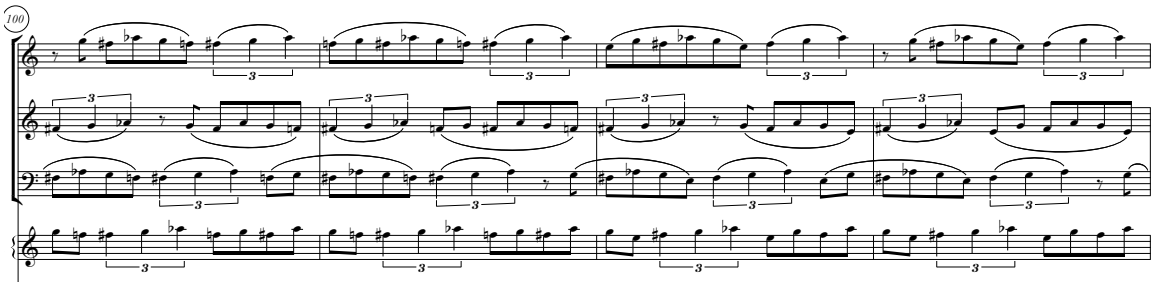


Fig. 3.13. Overlapping "serpentine" motive, *III.*, mm. 100-104

Once all four instruments have joined in on the pattern, the tetrachord begins to transform, shifting one pitch up or down a semitone at a time every four measures. In the first shift (m. 102, shown in Fig. 3.13 above), [F-F♯-G-A♭] becomes [E-F♯-G-A♭], outlining a major third, rather than a minor third. Next, the tetrachord shifts to [E-F♯-G-

A] in m. 106, creating a feel of E minor or G major (or any other modal variant). In m. 110, the F♯ becomes F, and in m. 114, the final transformation creates an [E-F-G♯-A] tetrachord. The augmented second and two semitones create maximal tension, and beckon for a release.

In "Signature Transformations," Julian Hook uses a mathematical cousin of neo-Riemannian theory to define what he terms "key signature transformations" in the music of Schubert and Torke, among others (Hook, 137). These transformations occur when a string of pitches retains its letter name set, but gains or loses sharps or flats. My process here can be thought of as a variant of this sort of transformation: although the letter names change, they could be respelled to be the same, albeit with double-sharps and flats (although this would violate Hook's requirement of diatonic strings).

This transformation is commonly found in minimalist and post-minimalist music, as Smith points out in her dissertation on the work of Torke: "While early minimalist composers seemed to favor rhythmic processes over tonal ones, Torke freely employs tonally motivated techniques in his pieces. In his 1995 composition *Telephone Book*, he progressively adds sharps to short, repeating motives to simulate the alphabetical ordering of last names with the same first letter in directory listings" (Smith, 22). Aside from the programmatic telephone book element, this is precisely what I have done in *III.*

Once the final transformation has occurred, the instruments join together in a chromatically winding eighth-note passage (mm. 118-20), and land on an E, which, after a brief accelerando in the marimba, sets up the final section: a return of the first thematic

material (mm. 32-68) in F. The first segment (which was the B section the first time) is performed identically, but the original motive, which returns at m. 127, is now squeezed into a tidy 16-beat phrase. This sets up the final segment (mm. 131-175), which undergoes an accelerando to ♩ = 60 as the motive is transposed up one semitone at a time every four measures. At m. 143, the transposition begins to take place twice as fast (every two bars), and at m. 147 twice as fast again (every bar, splitting the motive into two halves now). Once the transposition level has reach D in m. 151, the motive is clipped short by one eighth-note at a time, producing a 7/8 version, then a 3/4 version (m. 155), then a 5/8 version and so on, until it is reduced to one pitch at a time in m. 168. Here the transposition process descends back down to G, in 3/8 meter, creating a "malfunctioning printer" effect. Finally, the opening call-and-response sequence returns, and the piece ends on the quintal harmony [F-C-G-D].

3.6 Conclusions

Triptych marks the culmination of many threads of my development as a composer. On the most basic level, it is my longest work of instrumental music. At one point I found it difficult to generate more than a few minutes of music in any given piece; now my process is more focused on *erasing* material. I suppose this is a matter of gaining the all-holy "chops" as a composer. I can now flesh out ideas much more quickly than in the past, freeing me to make informed choices and intuitive leaps in my music. In composing *Triptych*, whenever I was confronted with a problem section, I would try out

several solutions and choose the one that fit best. In other words, composing has become a lot more like rational thinking for me.

On an aesthetic level, *Triptych* is my most focused work. As mentioned in the Introduction, I have settled on a style that is largely devoid of musical embroidery – unjustified flourishes, virtuosity for no apparent reason, etc. In the past, I felt the need to prove that I could write "idiomatically" for the instruments at hand, and, to my misguided mind, that meant unwarranted athleticism. The fact of the matter, however, is that some music demands this athleticism, and other music doesn't. I now know that my music – at least in my current style – does not require as much virtuosity in individual technique as it does in ensemble play. This is a very important realization.

Triptych is also my most ambitious work of electroacoustic music. Looking over my process, it is clear that I have improved greatly as a programmer in Max/MSP, as well as in my fixed media composition. In other words, I've gained electronic "chops" as well. As such, I have been able to forge a more perfect union between instruments and electronics, and developed new techniques for control and expression in my electroacoustic music. I know that I still have miles upon miles to go before I am a programmer of a truly high caliber, but I nonetheless feel as though I am operating at a professional level. And that is a good feeling for somebody who never programmed more than a graphing calculator in his life.

In retrospect, the logistical realities of the ensemble and the planned premiere have dictated the composition of the piece to a greater extent than I'd realized. I was originally commissioned for a shorter work, but decided to lengthen it and turn it into my

dissertation. When I approached the Fountain City Ensemble with the idea to make it a longer piece, they were all for it, but I nonetheless wanted to provide them with some flexibility for performance opportunities. That is, I didn't want the piece to always demand a full half of any concert program. So I decided that each movement would work as a standalone movement, which in turn accounted for the initiating sequences in each movement. In other words, I would not have included such lengthy introductory sections in each movement if I had not planned the piece this way. In addition, I decided that the first movement would be the easiest to mount – no live processing, all fixed media (with cueing) – which in turn had implications with respect to the future movements. Of course, it is always the case that logistics influence the composition process, particularly with electroacoustic works, but it is nonetheless important to recognize here.

Despite the assured proclamations of the treatise before you, the technique and style of this piece developed as it was composed. I knew I wanted to compose something for the ensemble – I had been commissioned, after all – and I knew it would contain some minimalist elements, but that was about it at the outset. It was only through a long process of sketching, scrapping, re-sketching and re-scrapping that I came upon my own aesthetic and philosophical convictions. And it will come as a supreme affirmation of the merits of the University of Texas Butler School of Music dissertation requirements when I say that the writing of this document has truly allowed these convictions to crystallize.

Ethan Frederick Greene

TRIPTYCH

for flute, clarinet, baritone saxophone, percussion and live electronics

2013

Triptych

for flute, clarinet, baritone saxophone, percussion and live electronics

Total duration: c. 31'30"

I. c. 12'
II. c. 11'
III. c. 8'30"

Instrumentation

Flute
Clarinet (doubles bass clarinet in B♭)
Baritone Saxophone
Percussion: Tam-tam, marimba (5-octave), crotales (F, B, C♯), xylophone, woodblocks (4 pitches), Tibetan singing bowls (C, G)
All instruments amplified and processed (more below)

Program Note

Triptych is a thirty-minute work in three movements for flute, clarinet (doubling bass clarinet), baritone saxophone, percussion and live electronics. Rhythmically intricate musical "tessellations" are juxtaposed with long, evolving drones amidst an electronic backdrop of environmental found sound, granular clouds, procedurally generated rhythmic sequences, and simple oscillators. The piece examines conceptions of pattern, pitch and period in the environment, highlighting the musical elements and structures of creatures and machines the "almost-human" musical beings all around us. Each "panel" of the triptych is designed to work effectively as either a part of the larger work, or as its own, autonomous piece of music. The electronics are designed to maximize performability and improvisatory flexibility in the ensemble. All processing and cueing is coded in Max/MSP. *Triptych* was commissioned by the Fountain City Ensemble, and will be premiered in March, 2014.

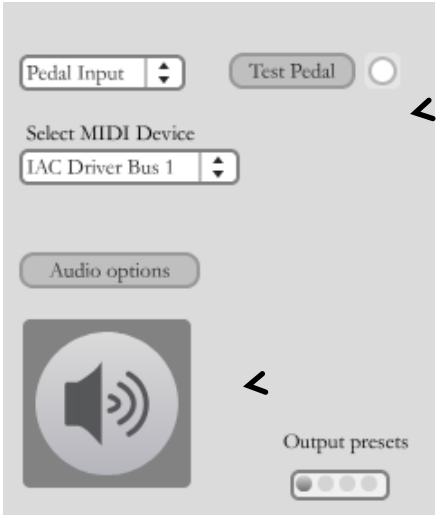
Technical Considerations

SOFTWARE REQUIRED: Max/MSP or Max/MSP Runtime (available at cycling74.com) version 5 or later

Startup Instructions:

1. Make sure your audio interface is plugged in and turned on.
2. Open the file named "TRIPTYCH_FULL.maxpat" (colored green on most systems).
3. In the "Input Handling" section, set your audio driver and input device.
4. In the bottom right corner, press the large speaker button to turn on audio.
5. Set your levels (the first Output preset is a good place to start) and play!

PEDALS AND AUDIO ON/OFF



- Choose your pedal input (MIDI, USB or Spacebar) and test it. Cueing will not work while "Testing..." is displayed.

- Audio Options: all your options!
  Big Speaker: turn audio on and off!
  Output presets: the first one is provided for you. Hold down 'shift' and click a circle to enter your own. WARNING: this will overwrite any previously saved presets.

More information will be provided by the composer. Please contact ethangreene@gmail.com before performance.

Score in C

Triptych
I.

Ethan Frederick Greene (2013)

MIDI Pedal Cue: 1 **Slowly, out of time (follow electronics)**

Flute

Clarinet in B♭

Baritone Saxophone

Tam-tam

Undulate in intensity, out of sync with other instruments.

Percussion

Electronics

*) Staccatissimo, gradually varying density as shown. Stay out of sync with other instruments.
Maximal density should be as fast as possible; minimal density should be close to quarter note at 60 bpm.

[0:45]

Continue pattern.

Fl.

Cl.

Bari. Sax.

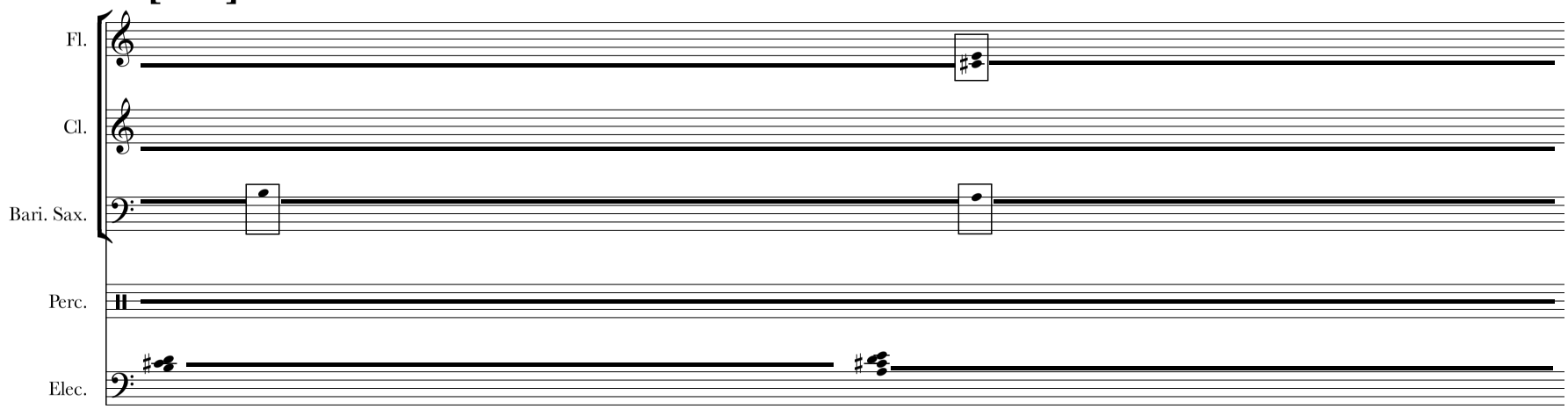
Continue pattern on given pitch. Follow synth.

Perc.

Elec.

[1:30]

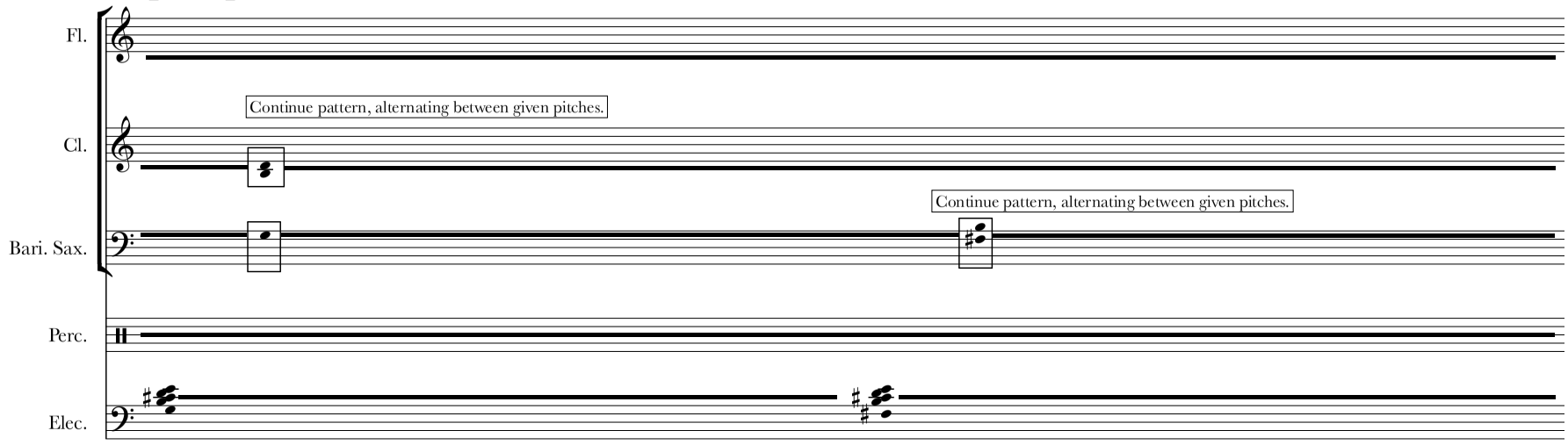
Continue pattern, alternating between given pitches.

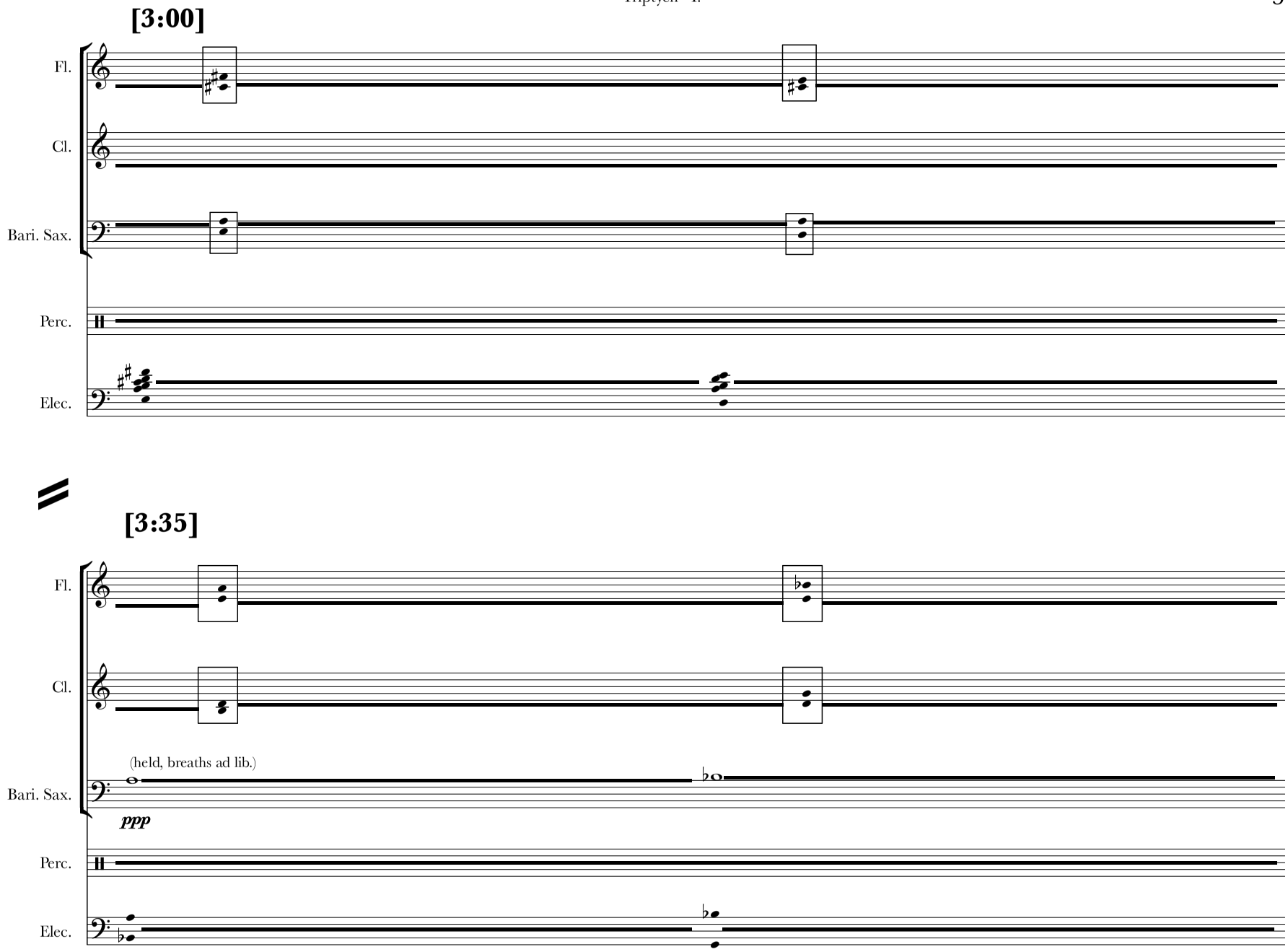


[2:25]

Continue pattern, alternating between given pitches.

Continue pattern, alternating between given pitches.




[3:00]
Fl.
Cl.
Bari. Sax.
Perc.
Elec.
49
[3:35]
Fl.
Cl.
(held, breaths ad lib.)
Bari. Sax.
ppp
Perc.
Elec.

[4:10]

Fl.

Cl.

Bari. Sax.

Perc.

Elec.

Continue pattern.

Continue pattern.

50

[4:45]

Fl.

Cl.

Bari. Sax.

Perc.

Elec.

mf

mf

mf

mf

[5:00]

(trailing off into electronics)

Fl.

p

(trailing off into electronics)

Cl.

p

Bari. Sax.

(fewer and fewer strikes)

Perc.

Jungle sounds, coquí frogs (c. 0:30)

Elec.

51

2 [c. 5:30]

Moderately, rigid (♩=100)

Fl.

Cl.

extremely short, *mechanically*

Bari. Sax.

p

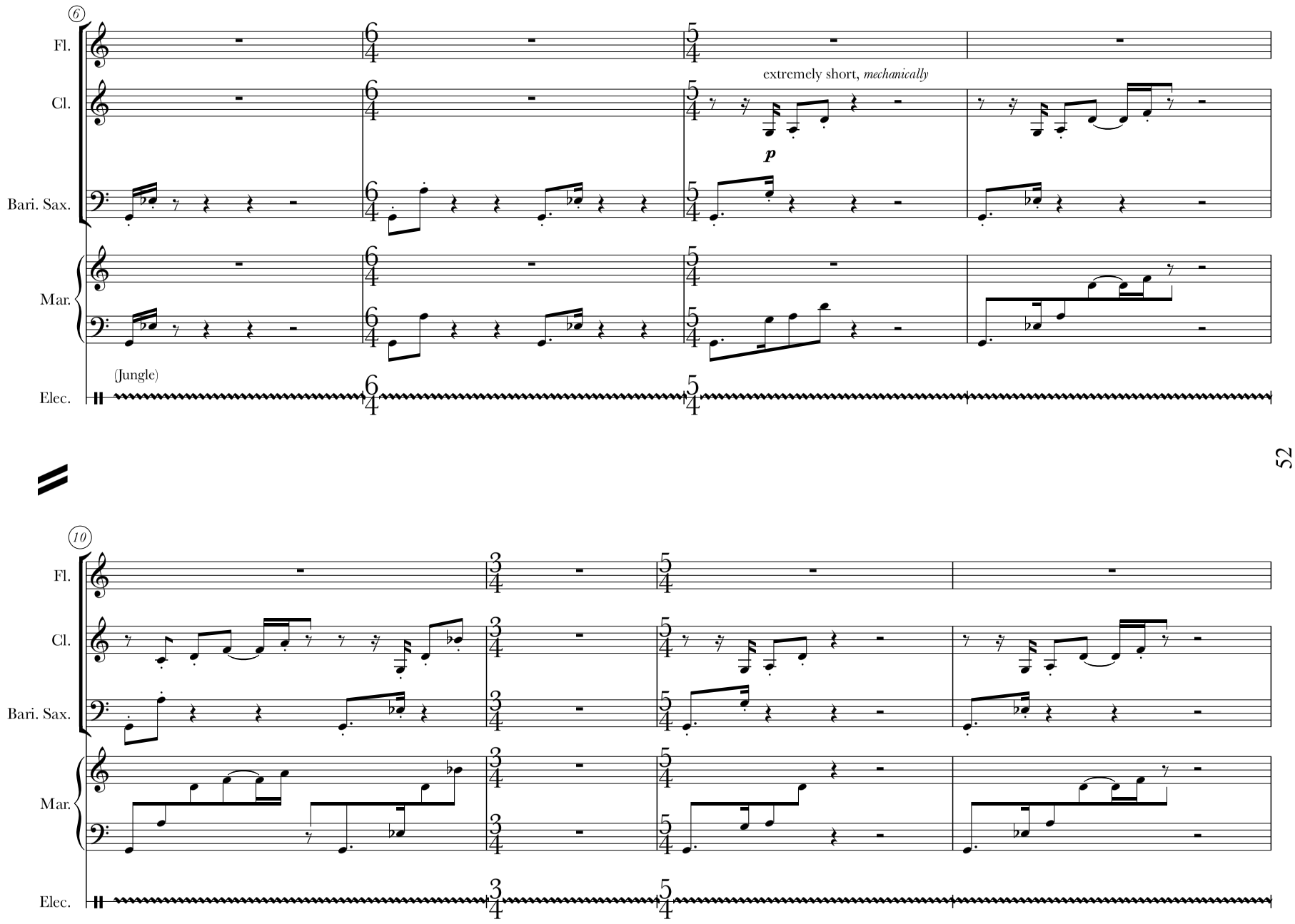
hard mallets, *mechanically*

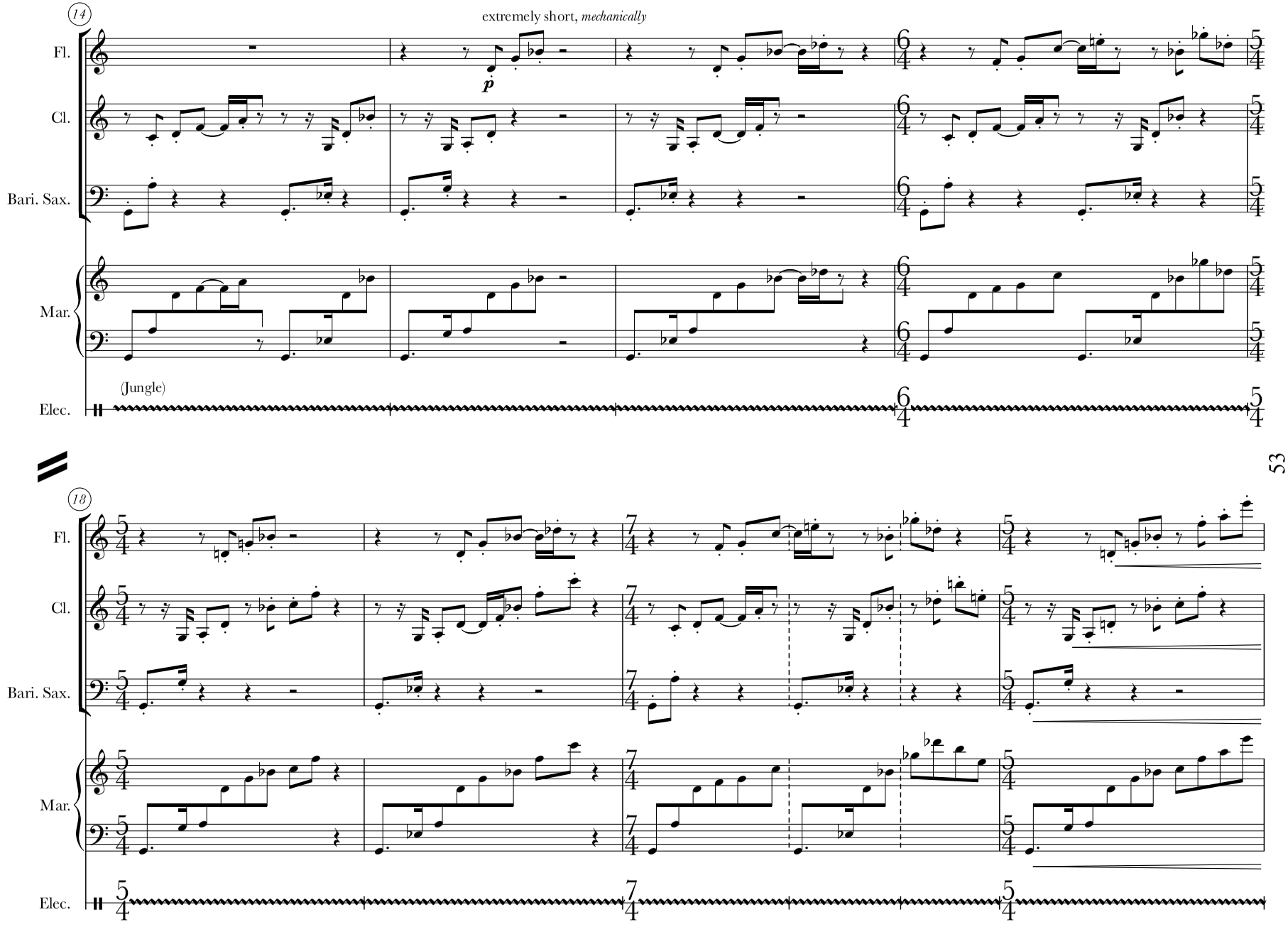
Mar.

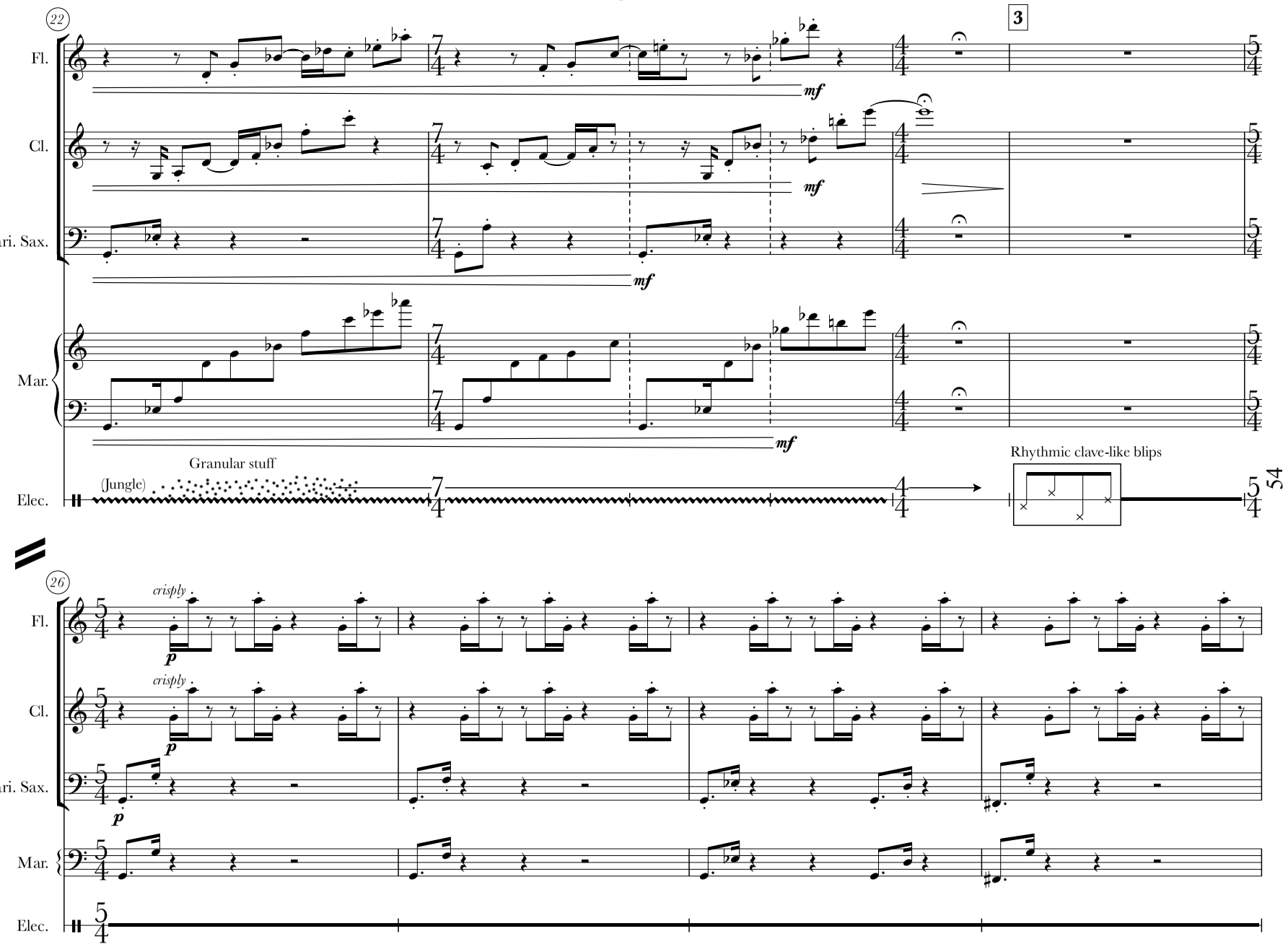
p

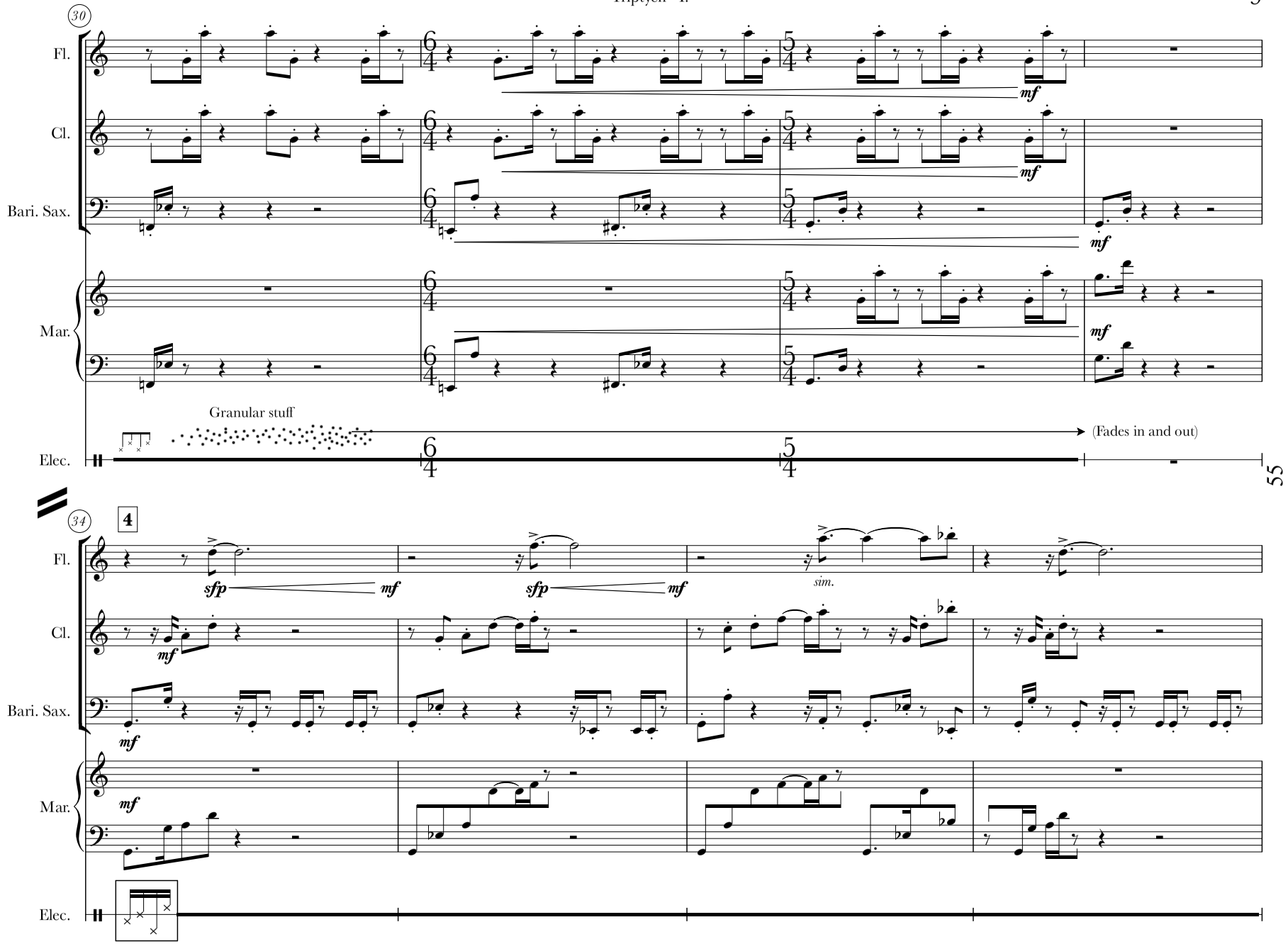
Jungle sounds, coquí frogs continue...

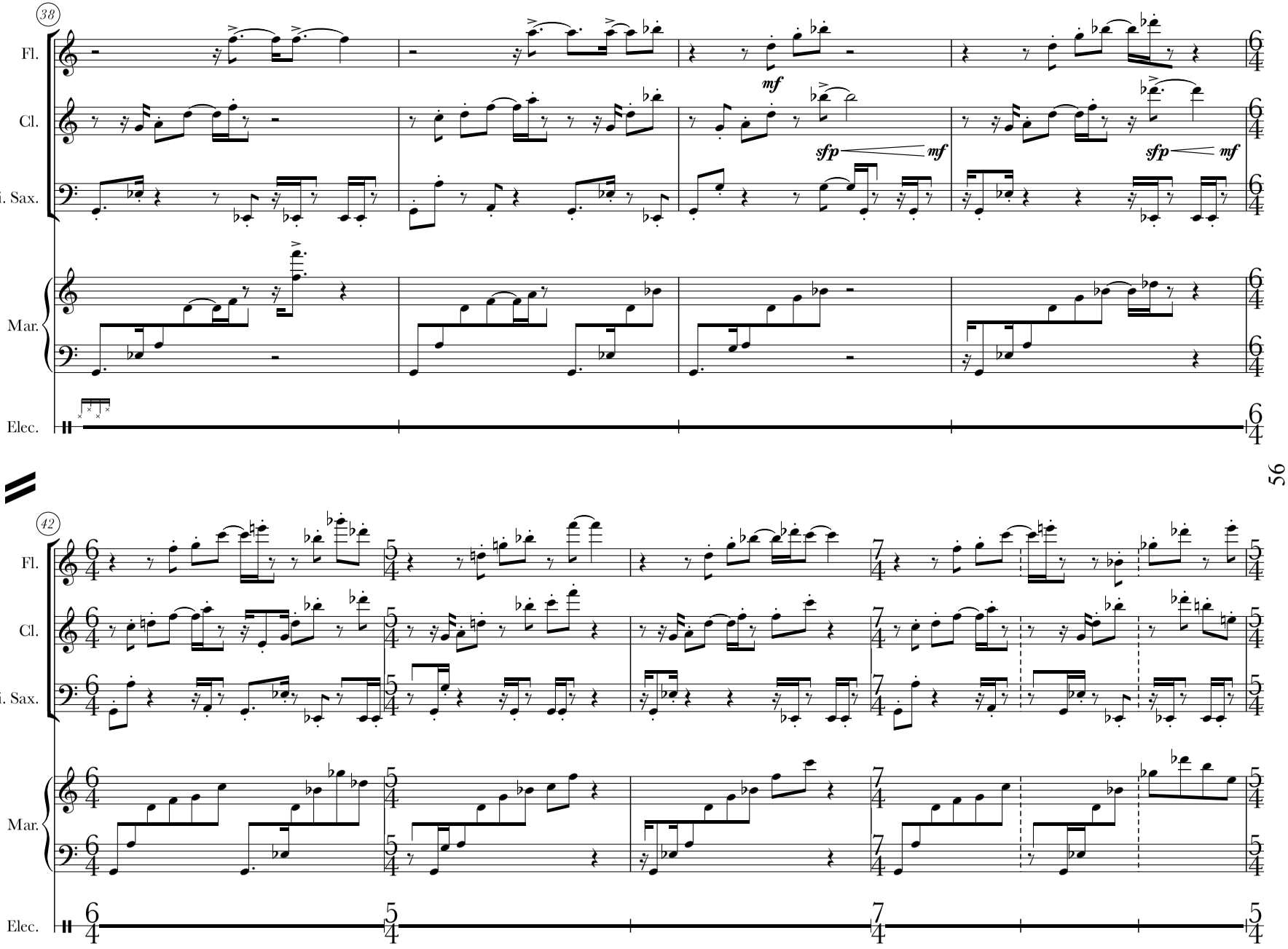
Elec.

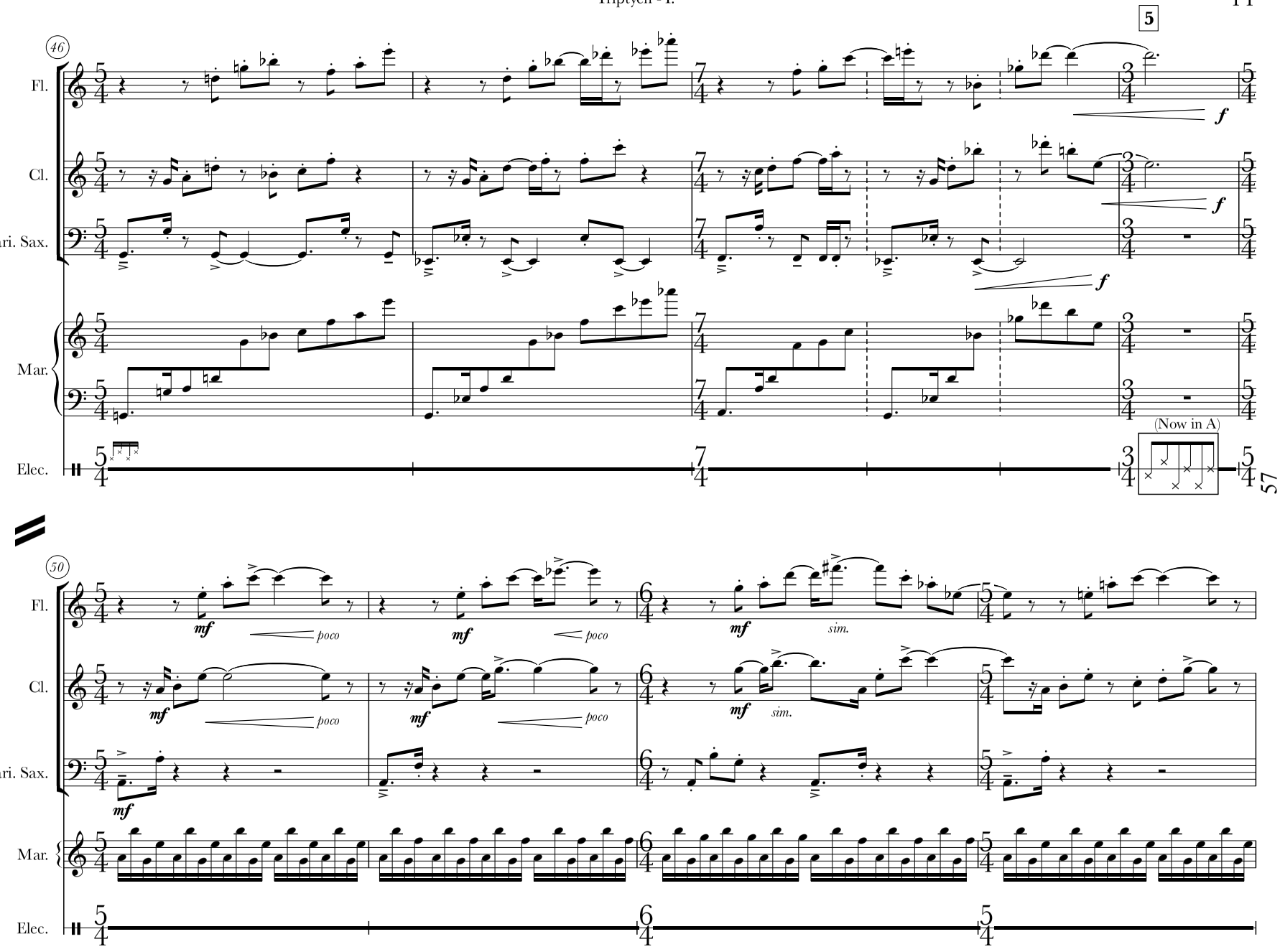

6
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
(Jungle)
extremely short, *mechanically*
p
10
Fl.
Cl.
Bari. Sax.
Mar.
Elec.

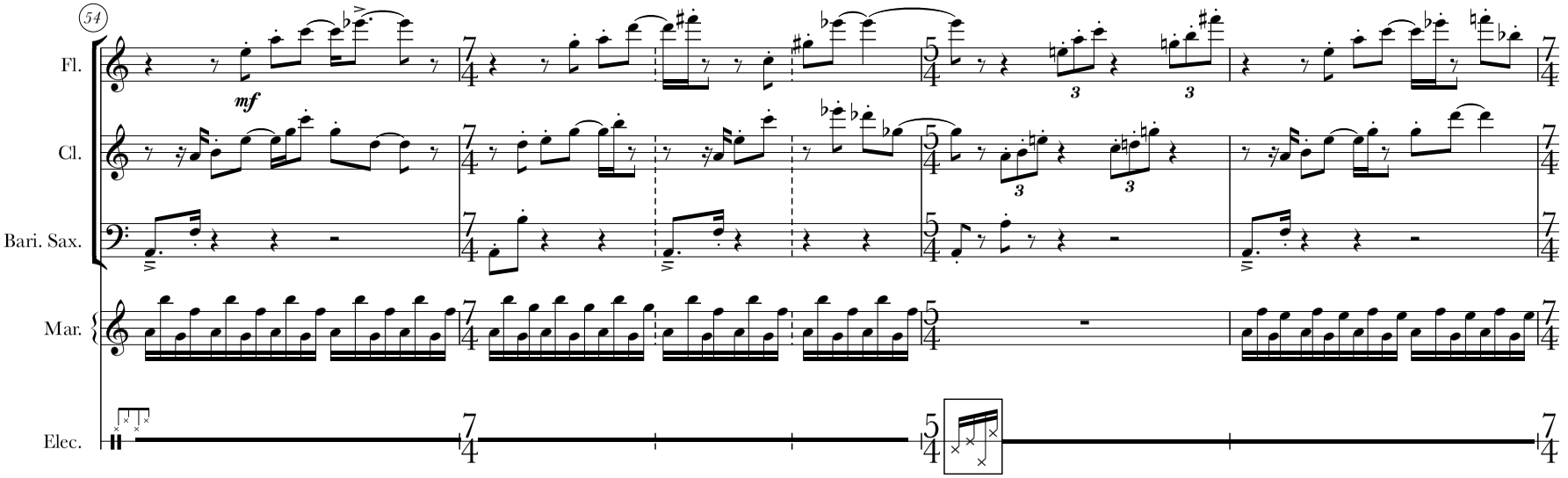

14
extremely short, mechanically
p
Fl.
Cl.
Bari. Sax.
Mar.
(Jungle)
Elec.
18
Fl.
Cl.
Bari. Sax.
Mar.
Elec.

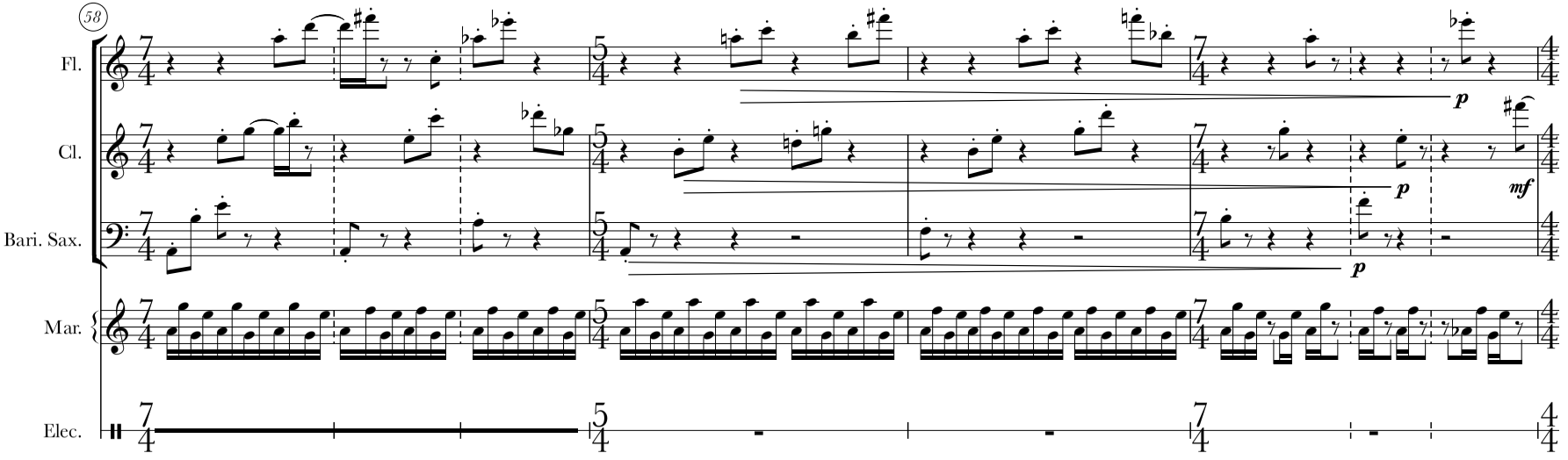

22
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
mf
3
Granular stuff
(Jungle)
Rhythmic clave-like blips
54
26
crisply
p

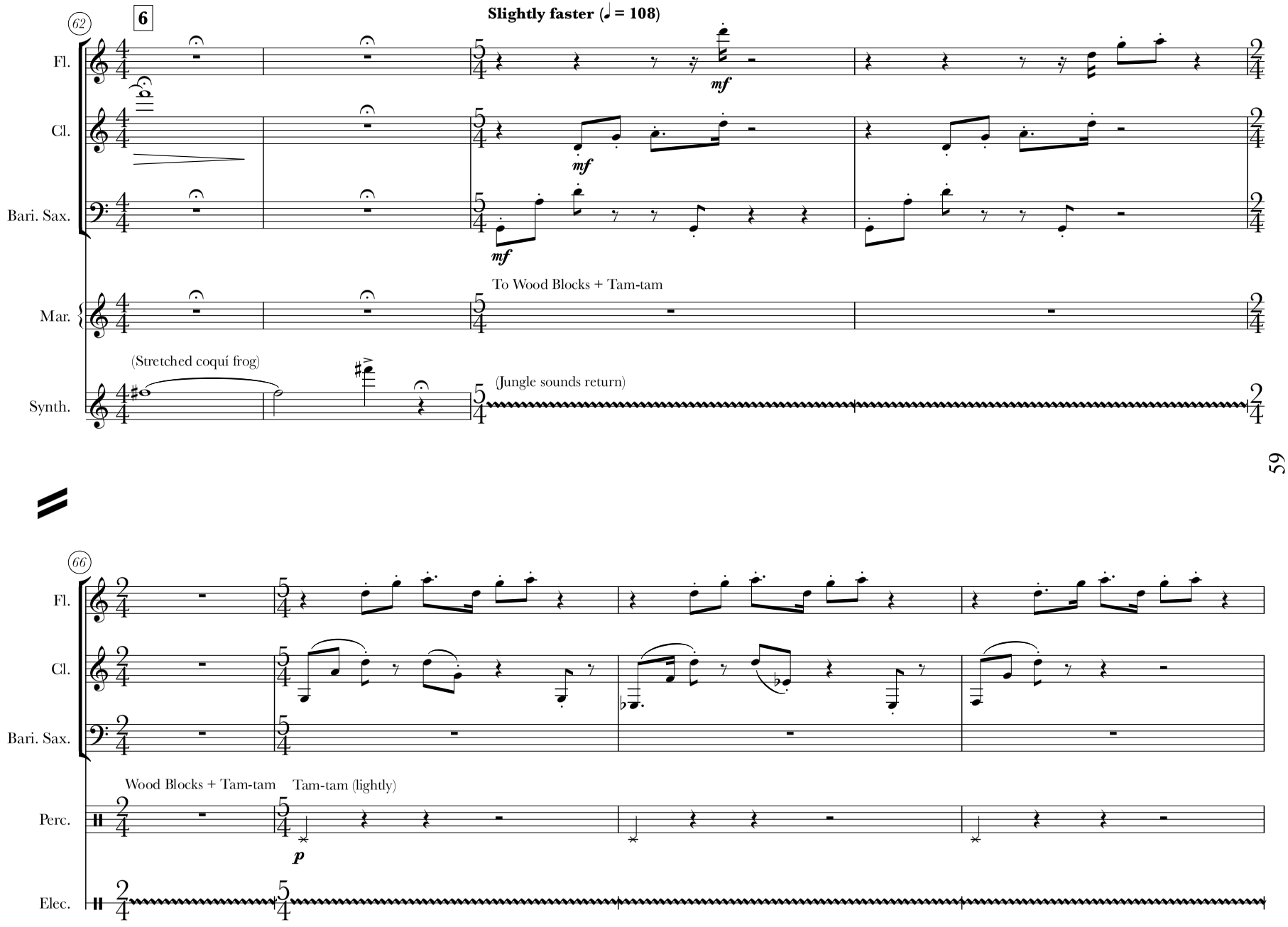

30
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
mf
Granular stuff
(Fades in and out)
55
34
4
sfp
sim.

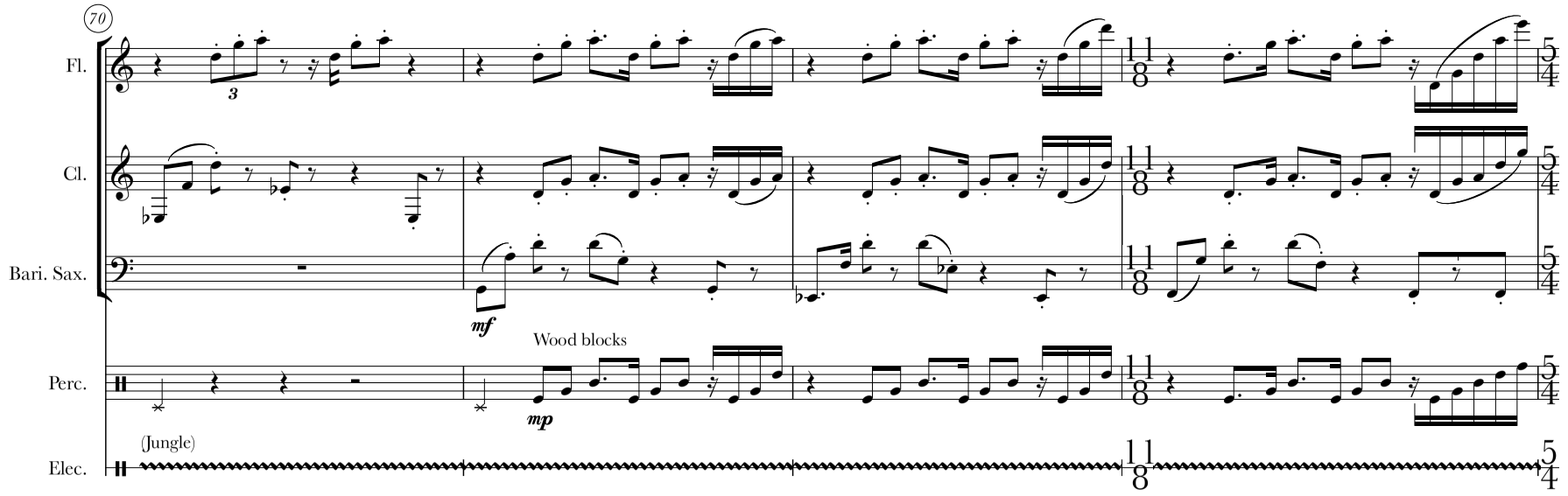

38
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
mf
sfp
mf
sfp
mf
42
Fl.
Cl.
Bari. Sax.
Mar.
Elec.

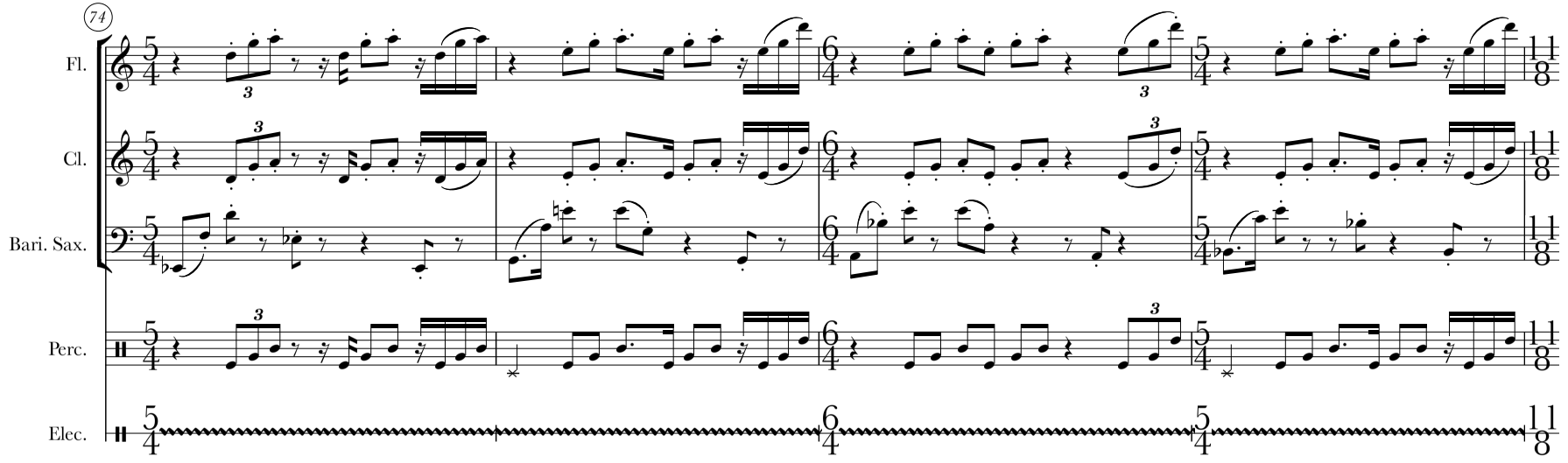

46
5
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
f
(Now in A)
57
50
mf
poco
sim.

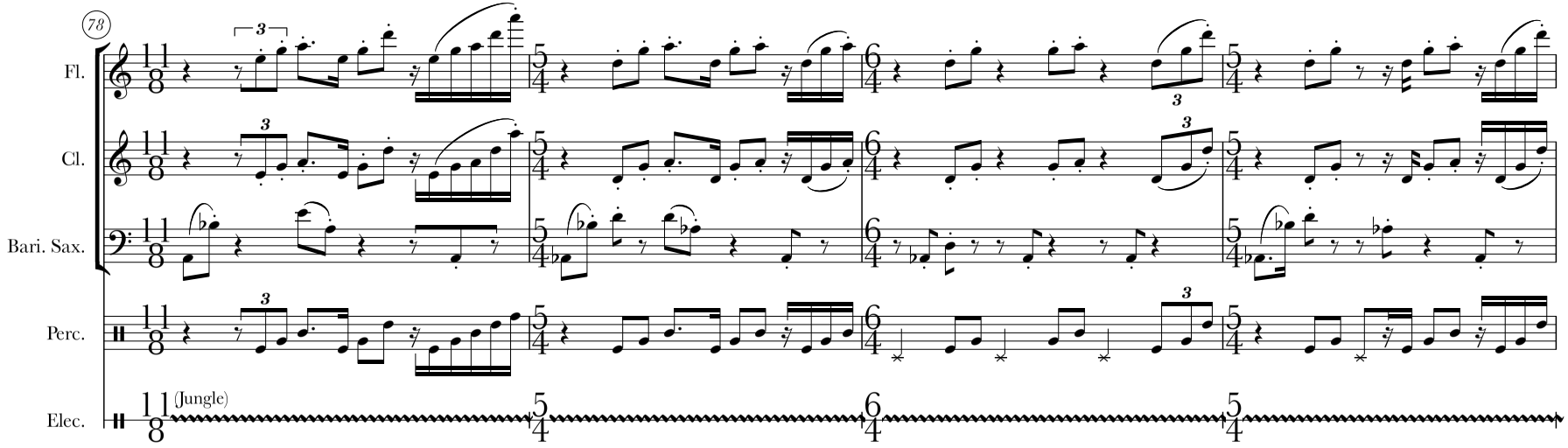

54
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
mf

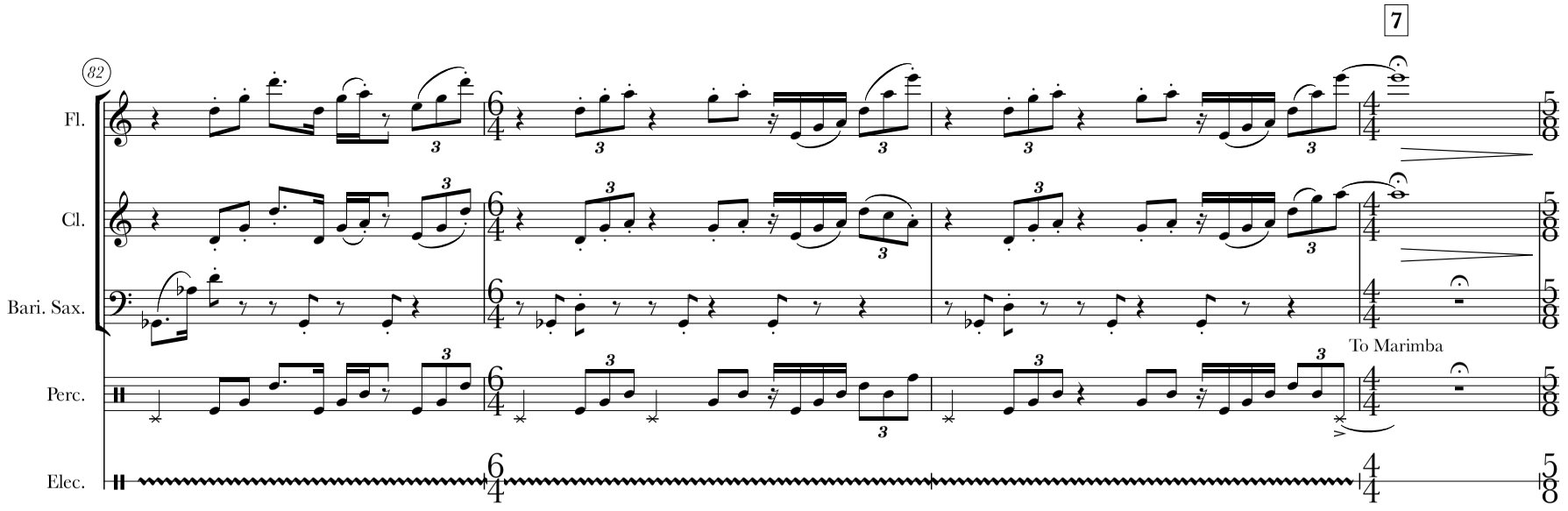

58
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
p
p
p
mf

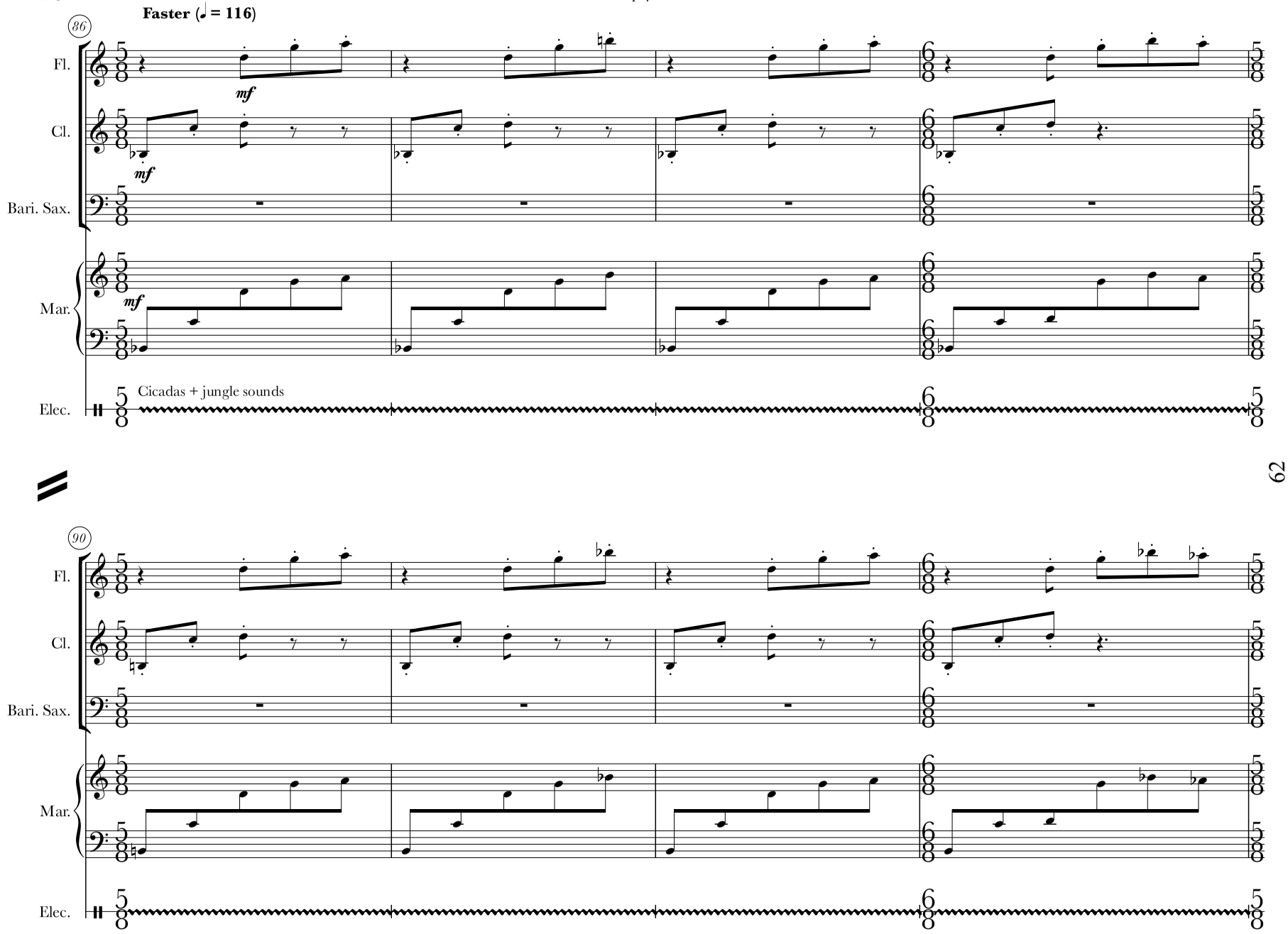

62
6
Slightly faster (♩ = 108)
Fl.
Cl.
Bari. Sax.
mf
Mar.
To Wood Blocks + Tam-tam
(Stretched coquí frog)
Synth.
(Jungle sounds return)
66
Wood Blocks + Tam-tam
Tam-tam (lightly)
Perc.
p
Elec.

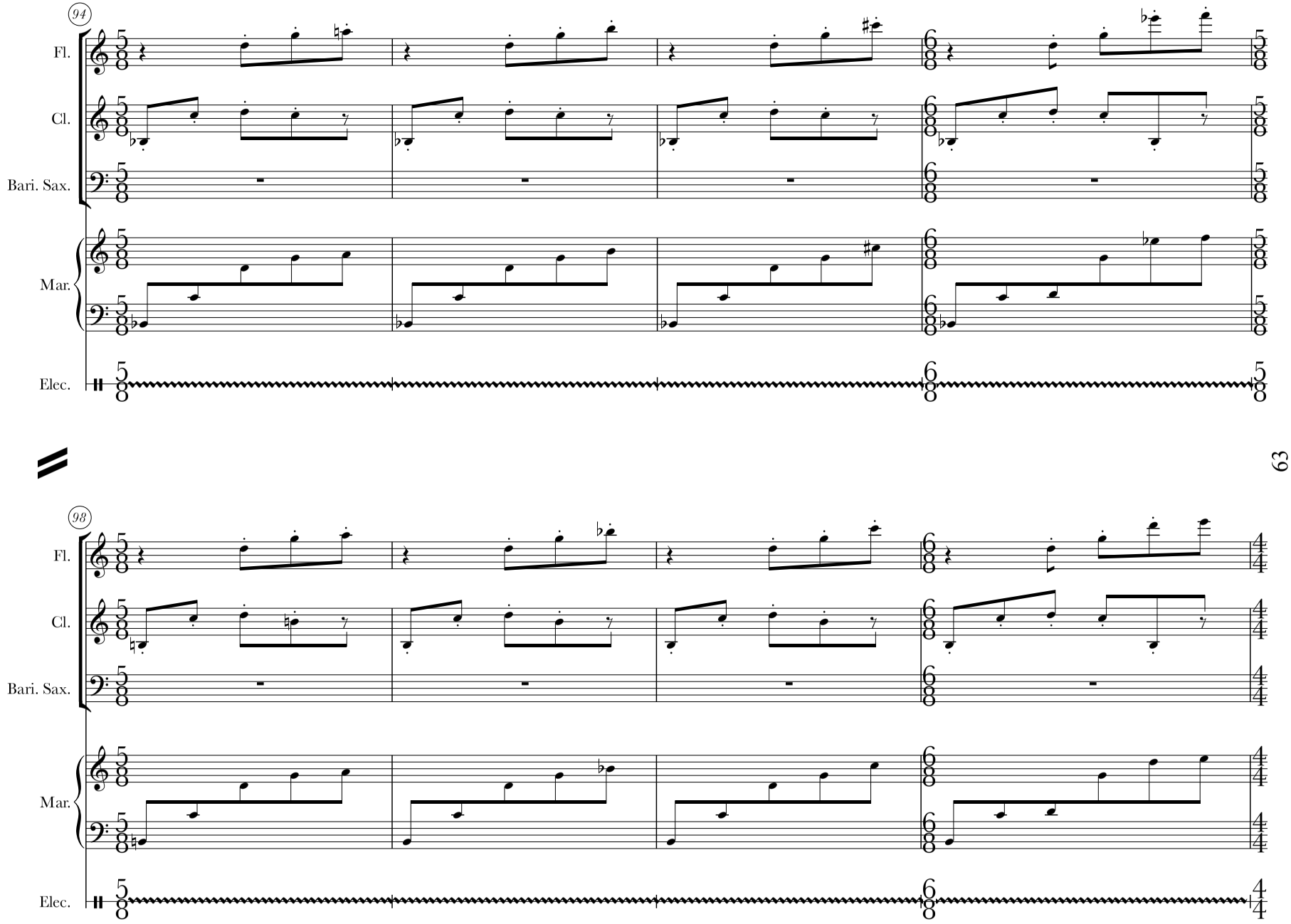

70
Fl.
Cl.
Bari. Sax.
mf
Wood blocks
Perc.
mp
(Jungle)
Elec.

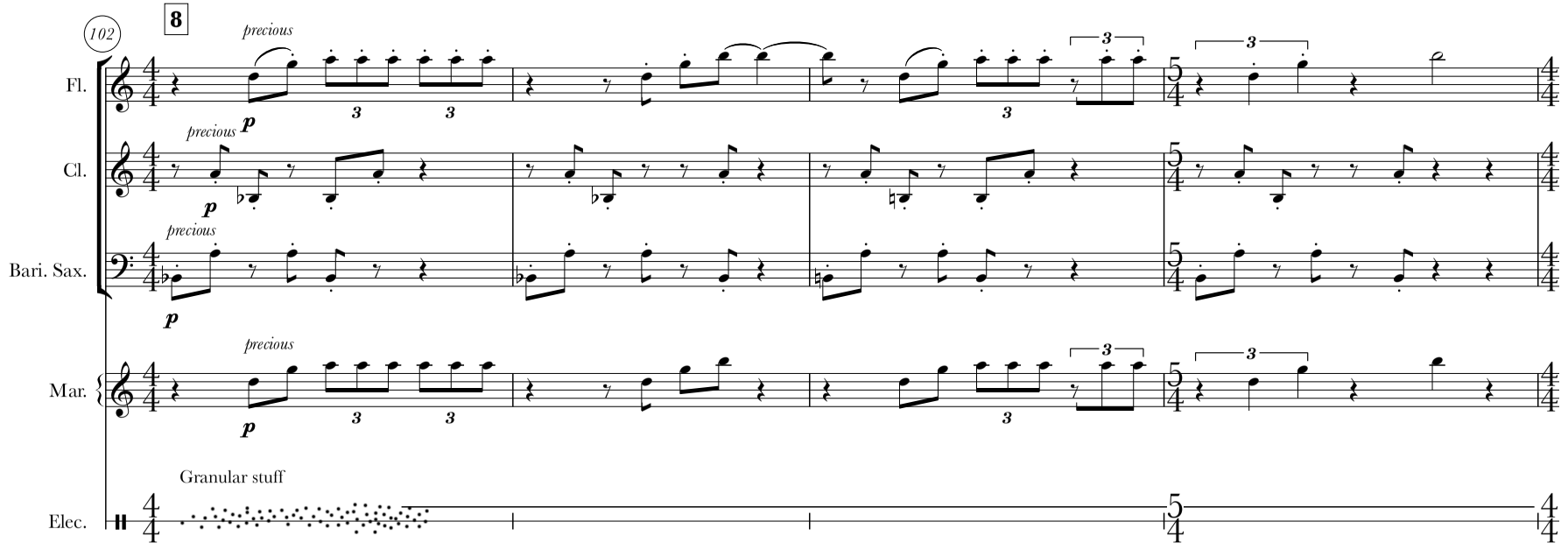

74
Fl.
Cl.
Bari. Sax.
Perc.
Elec.

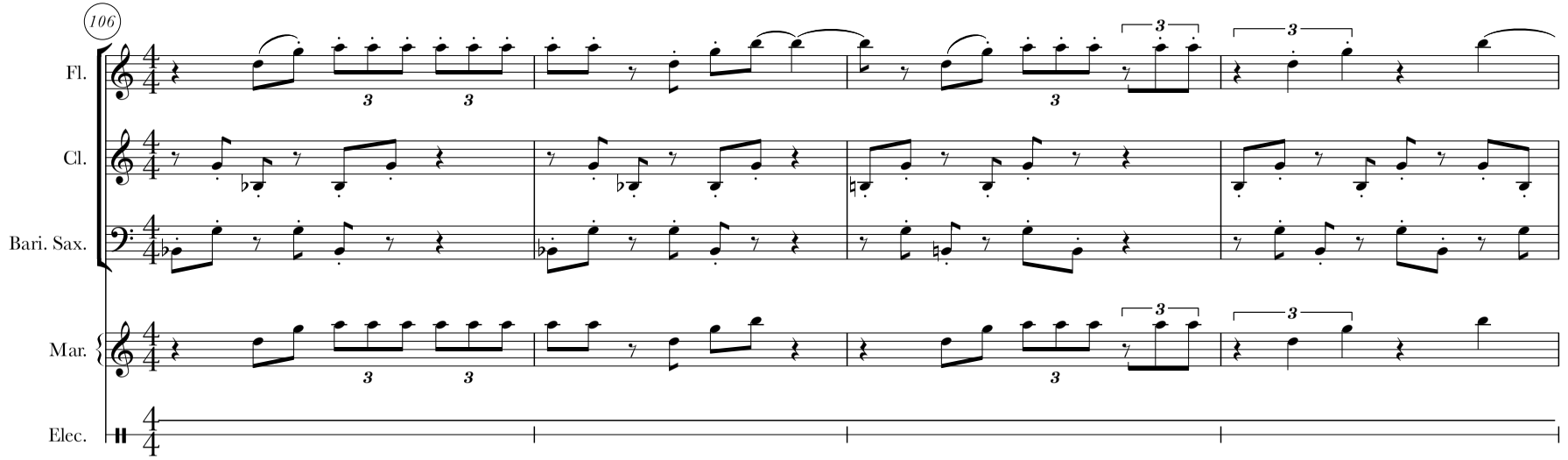

78
Fl.
Cl.
Bari. Sax.
Perc.
Elec.
(Jungle)

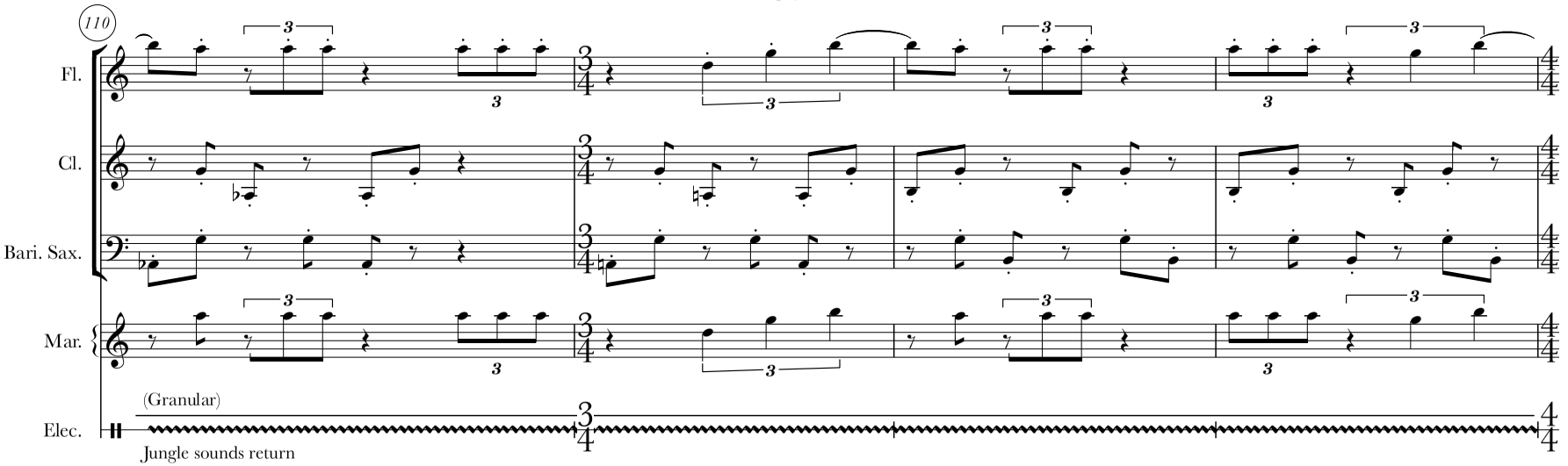

7
82
Fl.
Cl.
Bari. Sax.
Perc.
Elec.
To Marimba

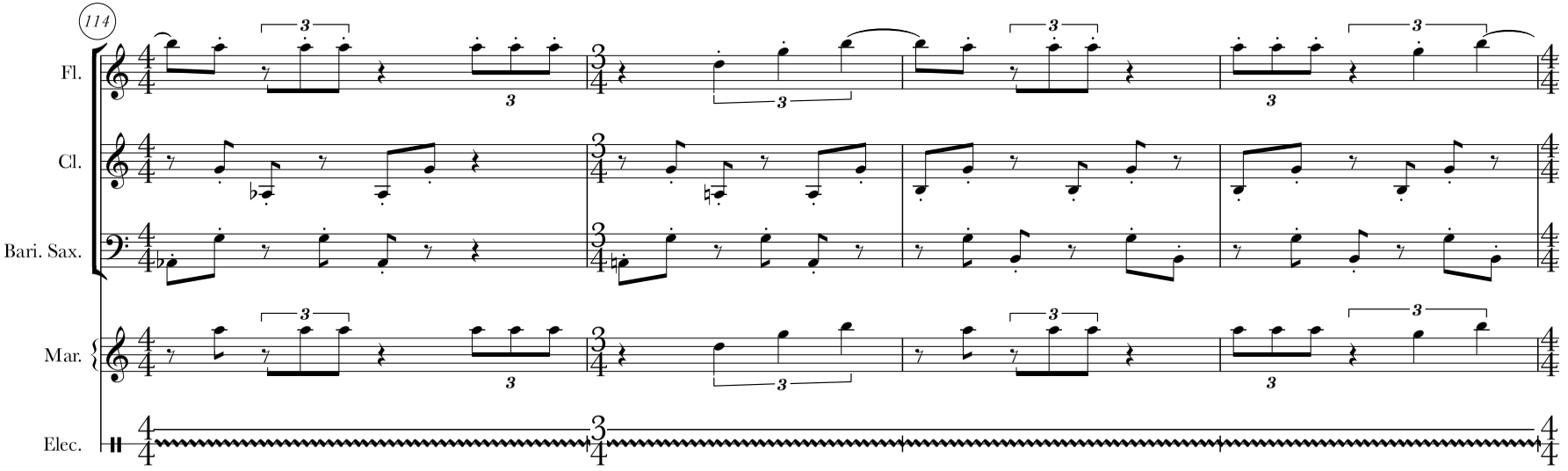

Faster (♩ = 116)
86
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
mf
mf
mf
Cicadas + jungle sounds
90
Fl.
Cl.
Bari. Sax.
Mar.
Elec.

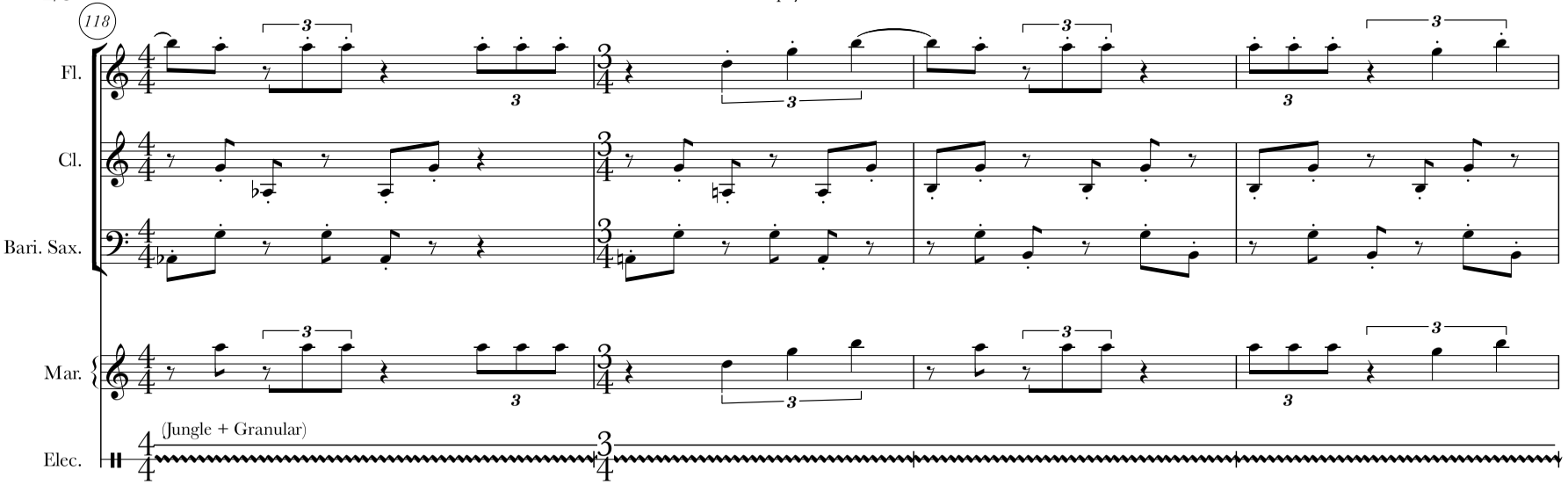

94
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
98
Fl.
Cl.
Bari. Sax.
Mar.
Elec.

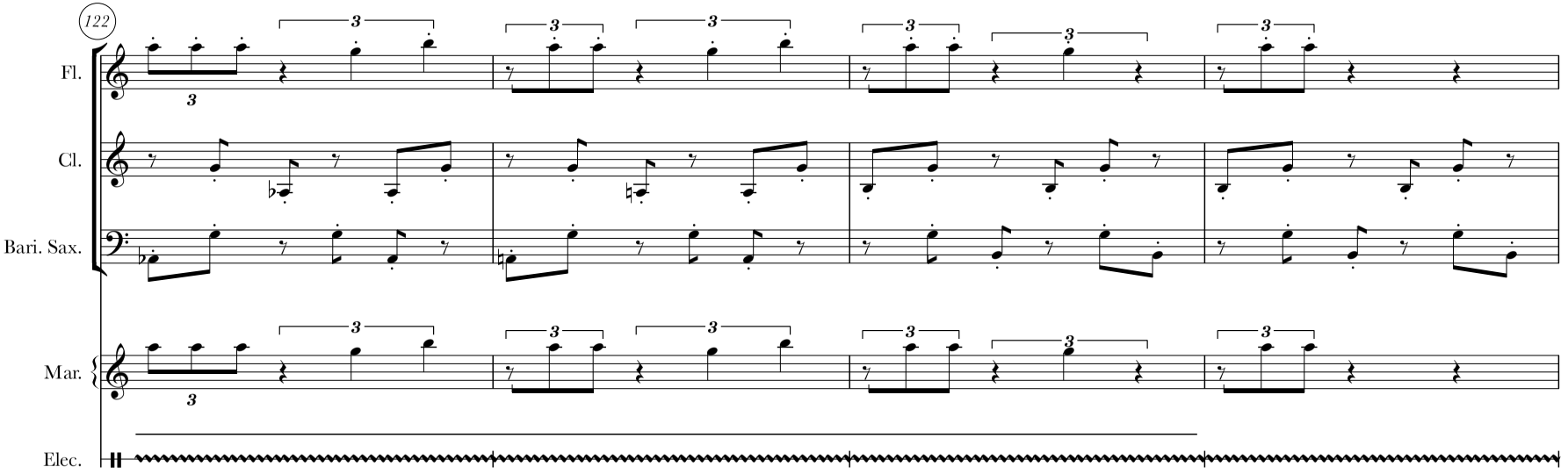

102
8
precious
Fl.
precious
p
Cl.
precious
Bari. Sax.
p
precious
Mar.
p
Granular stuff
Elec.

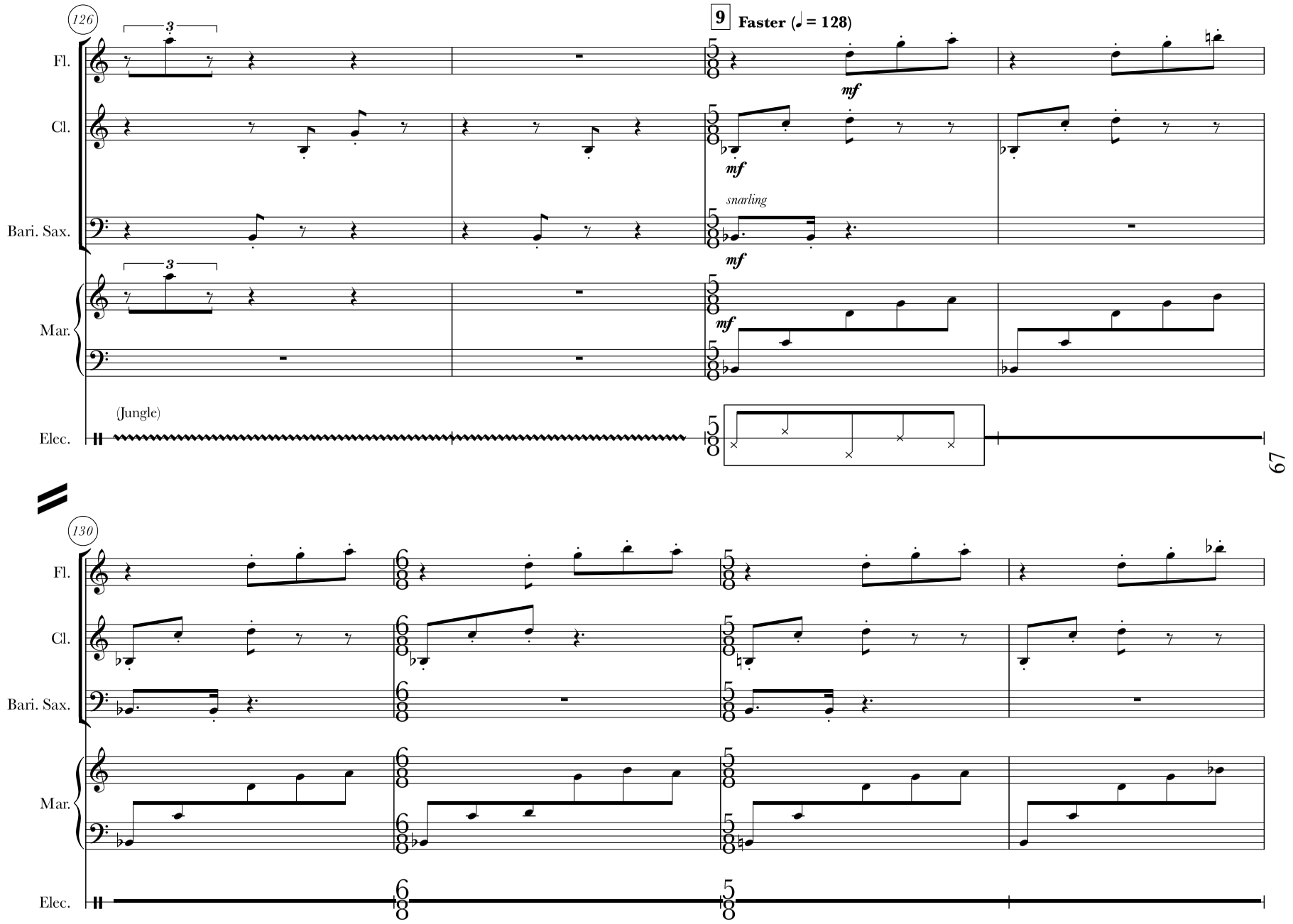

106
Fl.
Cl.
Bari. Sax.
Mar.
Elec.

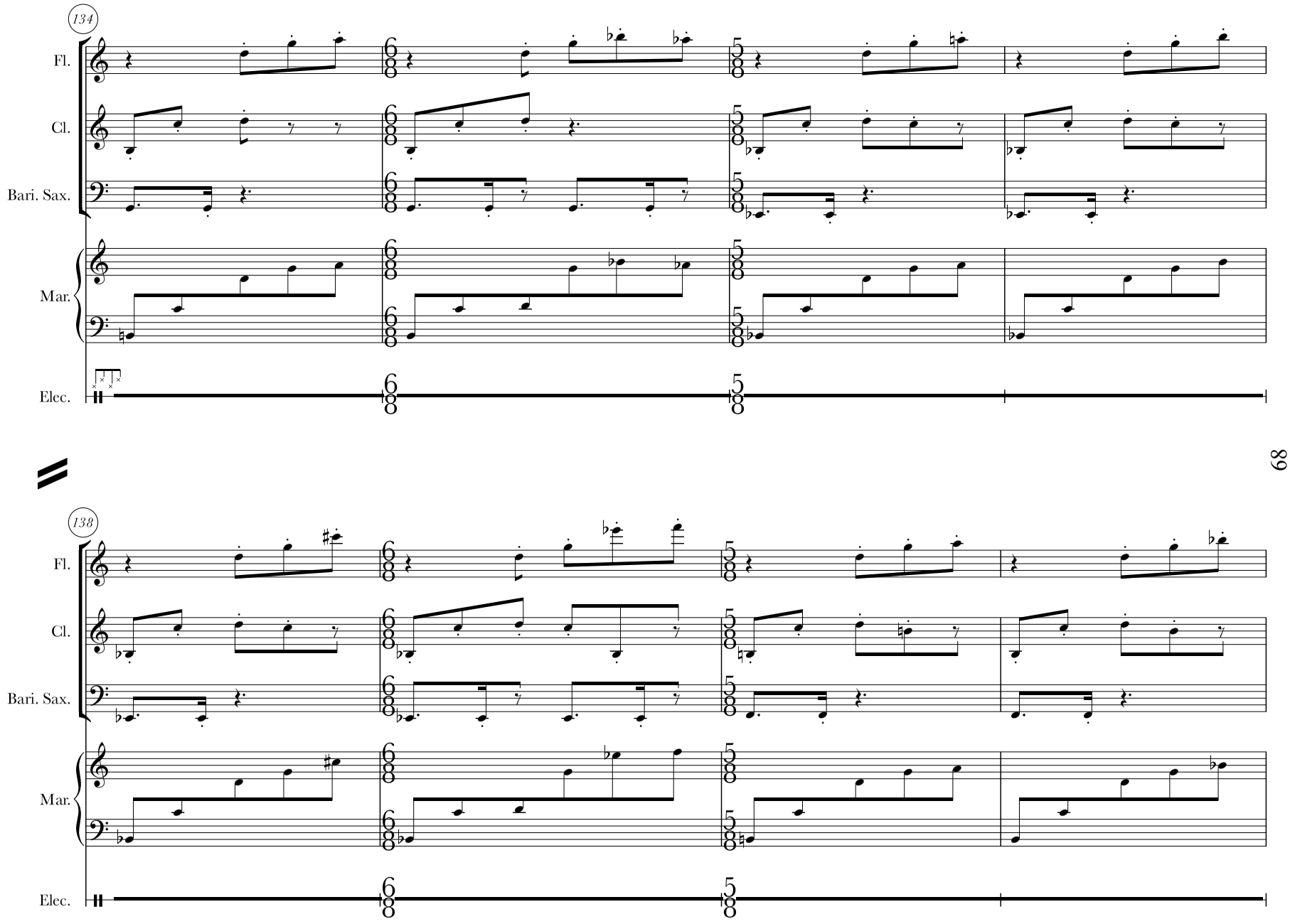

110
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
(Granular)
Jungle sounds return

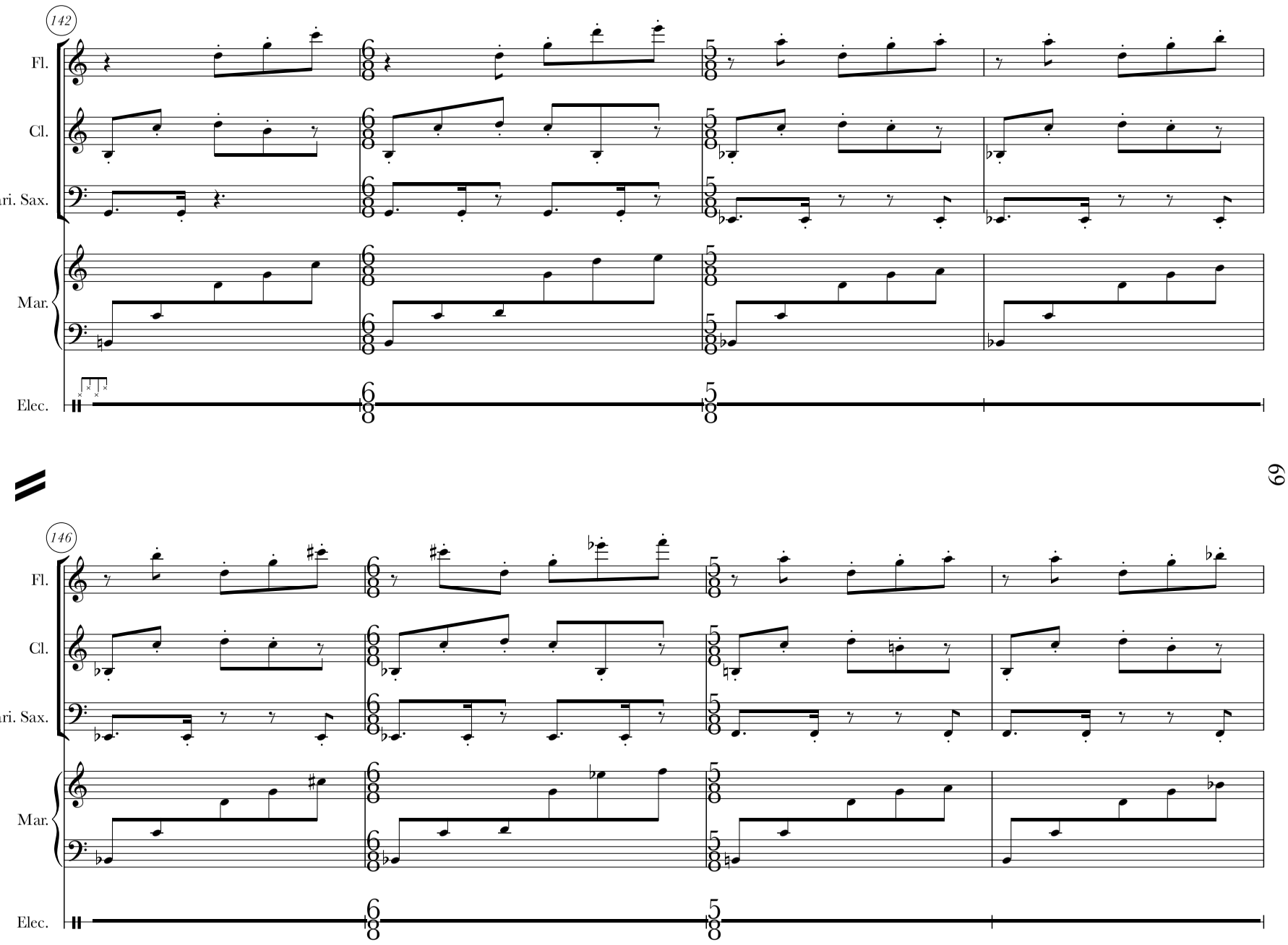

114
Fl.
Cl.
Bari. Sax.
Mar.
Elec.

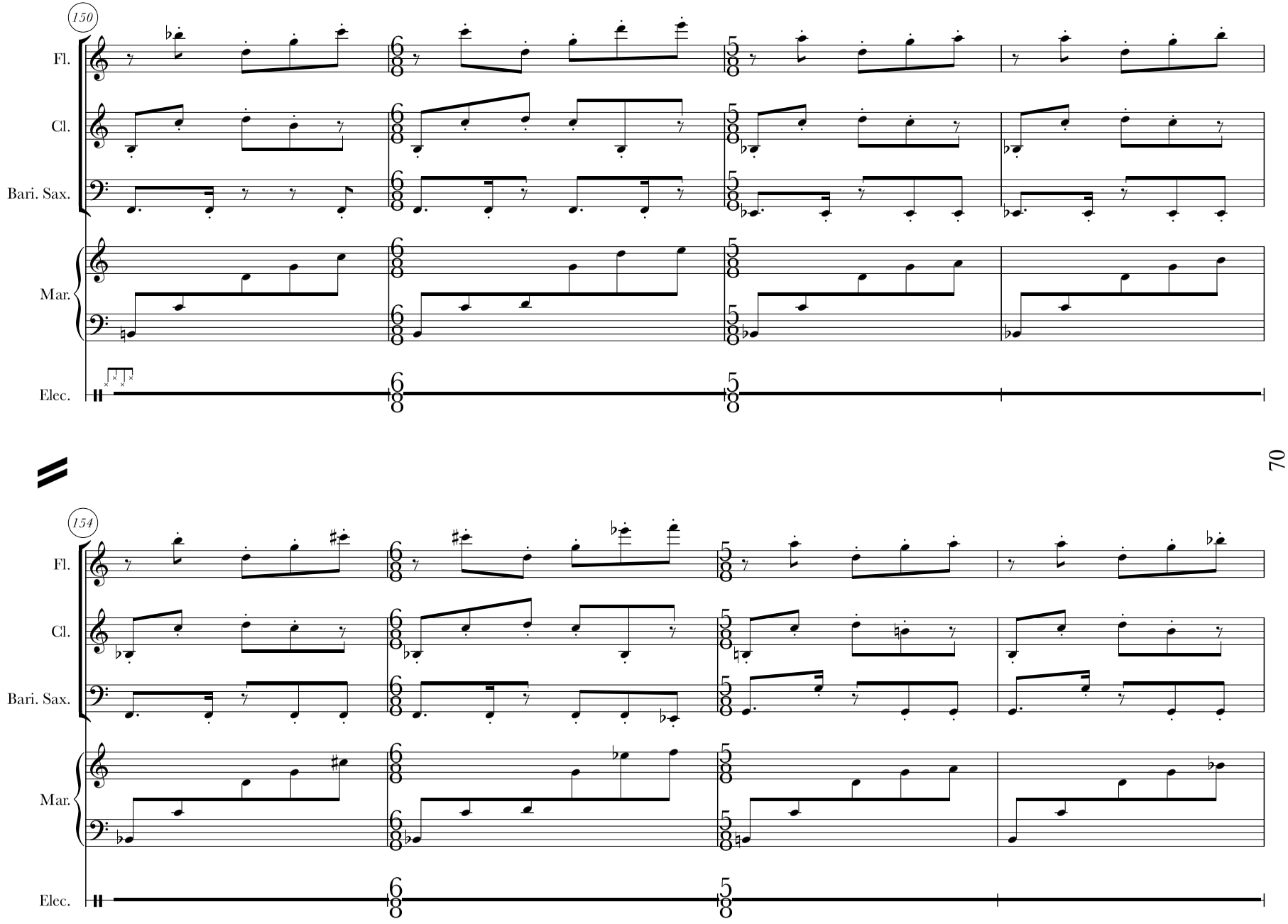

118
Fl.
Cl.
Bari. Sax.
Mar.
(Jungle + Granular)
Elec.

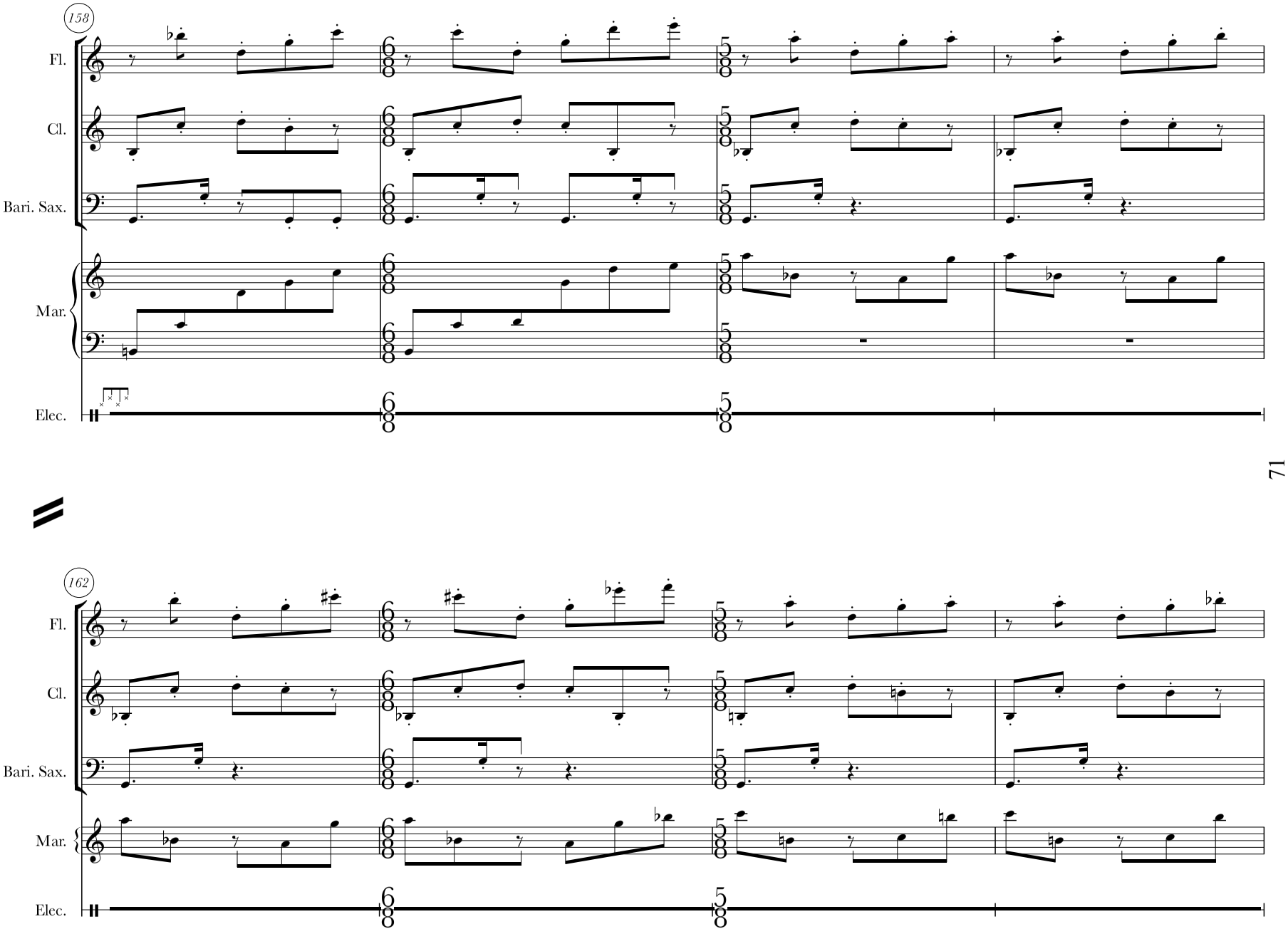

122
Fl.
Cl.
Bari. Sax.
Mar.
Elec.

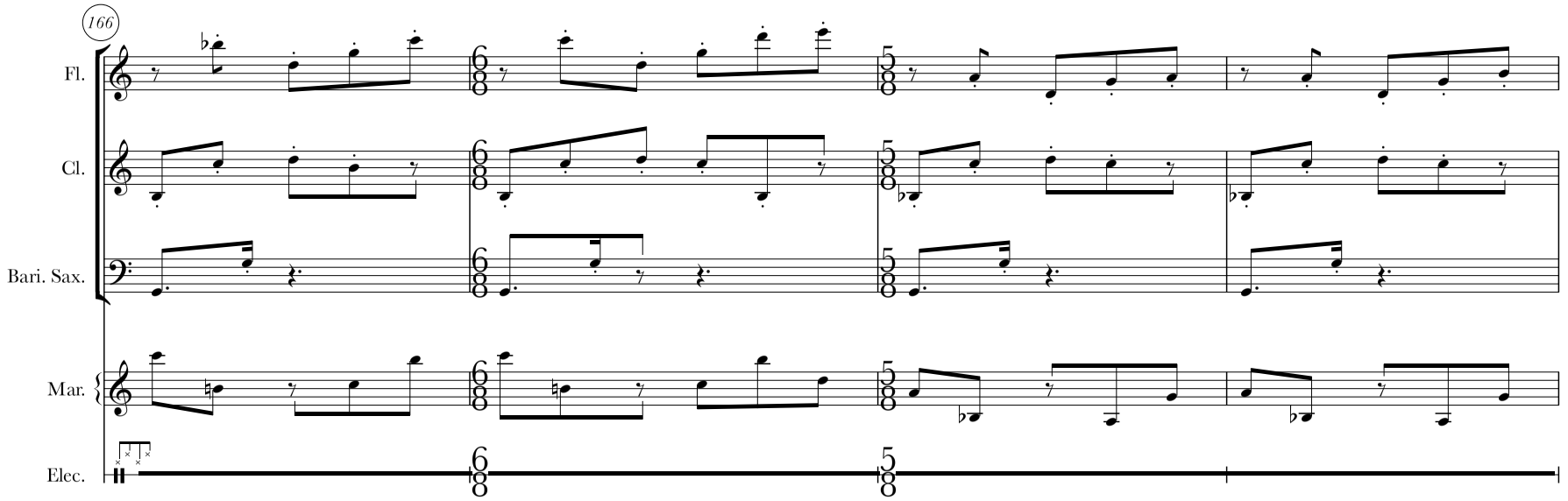

126
9
Faster (♩ = 128)
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
mf
snarling
(Jungle)
67
130

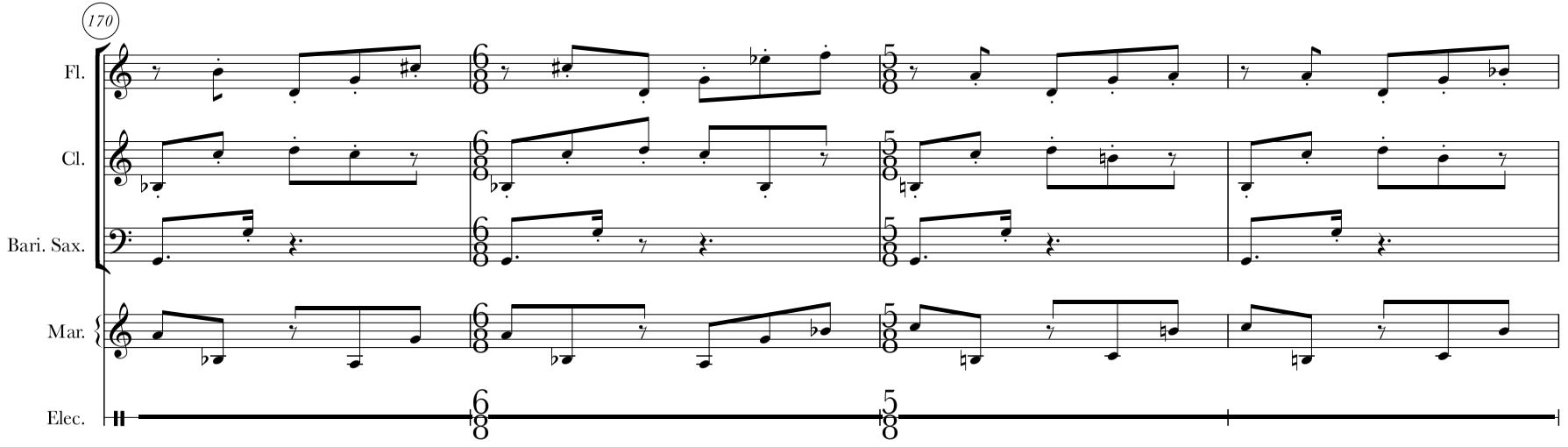

134
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
138
Fl.
Cl.
Bari. Sax.
Mar.
Elec.


142
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
146
Fl.
Cl.
Bari. Sax.
Mar.
Elec.


150
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
154
Fl.
Cl.
Bari. Sax.
Mar.
Elec.


158
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
71
162
Fl.
Cl.
Bari. Sax.
Mar.
Elec.


166
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
6/8
5/8

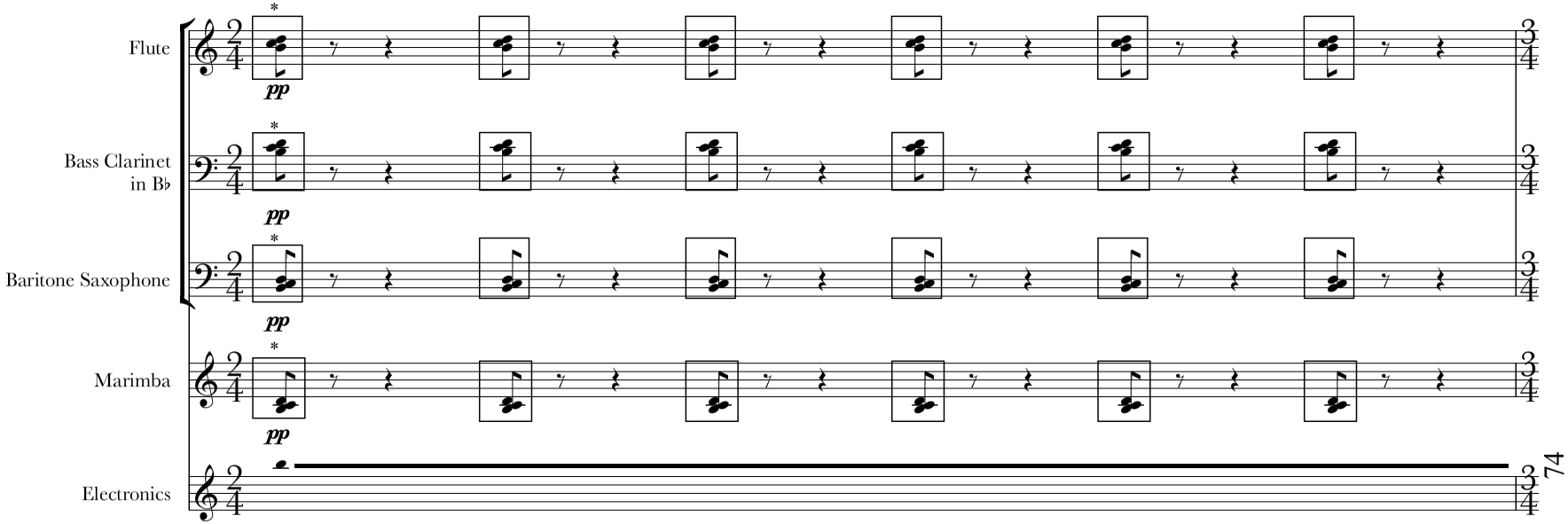

170
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
6/8
5/8


174
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
178
10
Fl.
Cl.
Bari. Sax.
Mar.
Elec.

II.

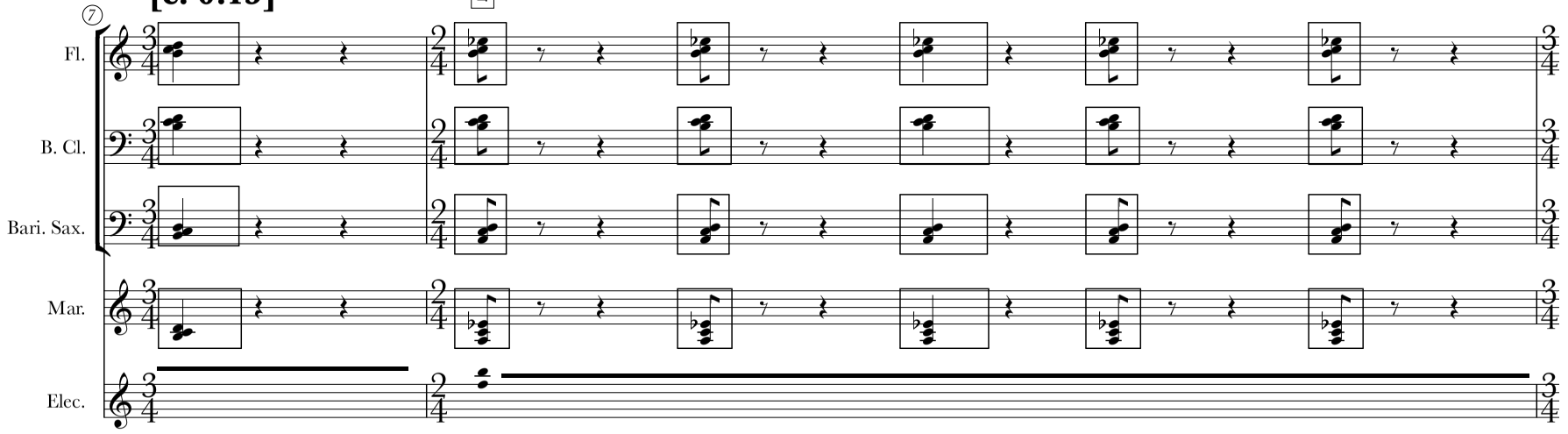
MIDI Pedal Cue: 1 **Slowly, roughly in time (♩ = c. 50)**

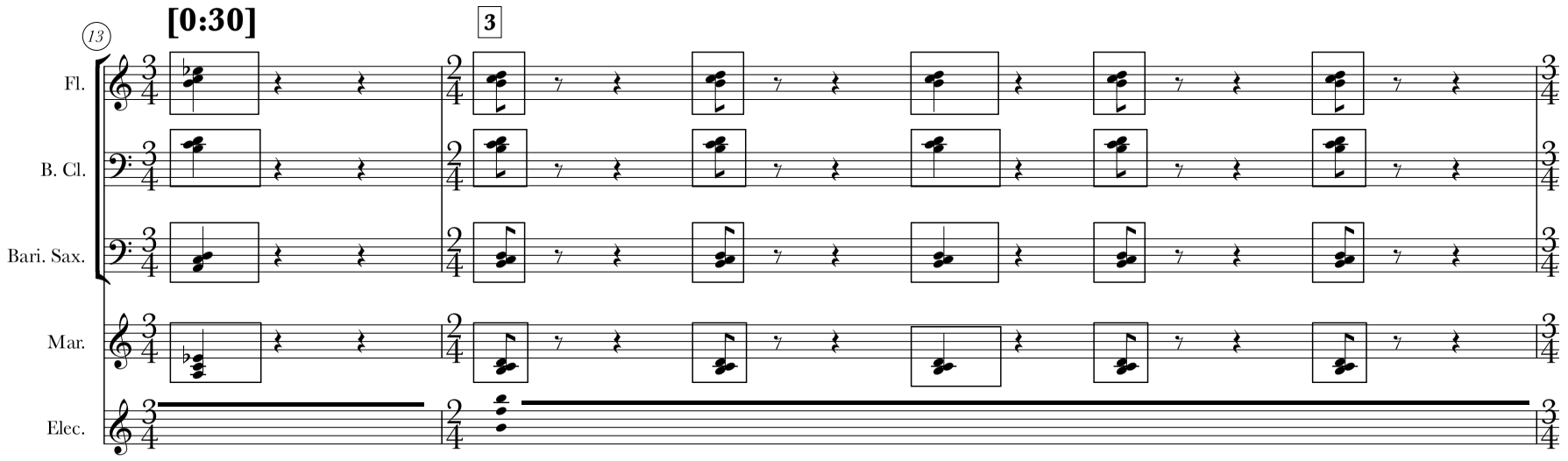
Ethan Frederick Greene (2013)

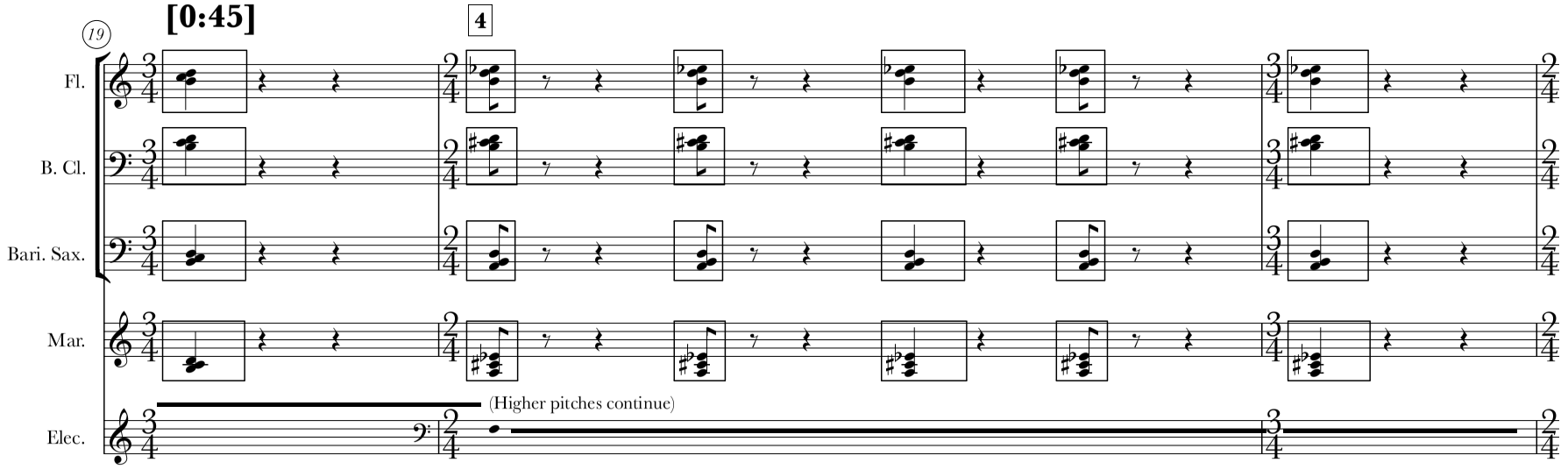


*) *A tangled knot*: play indicated notes (slurred) as quickly as possible in any order for indicated length. Vary each iteration.

[c. 0:15] 2

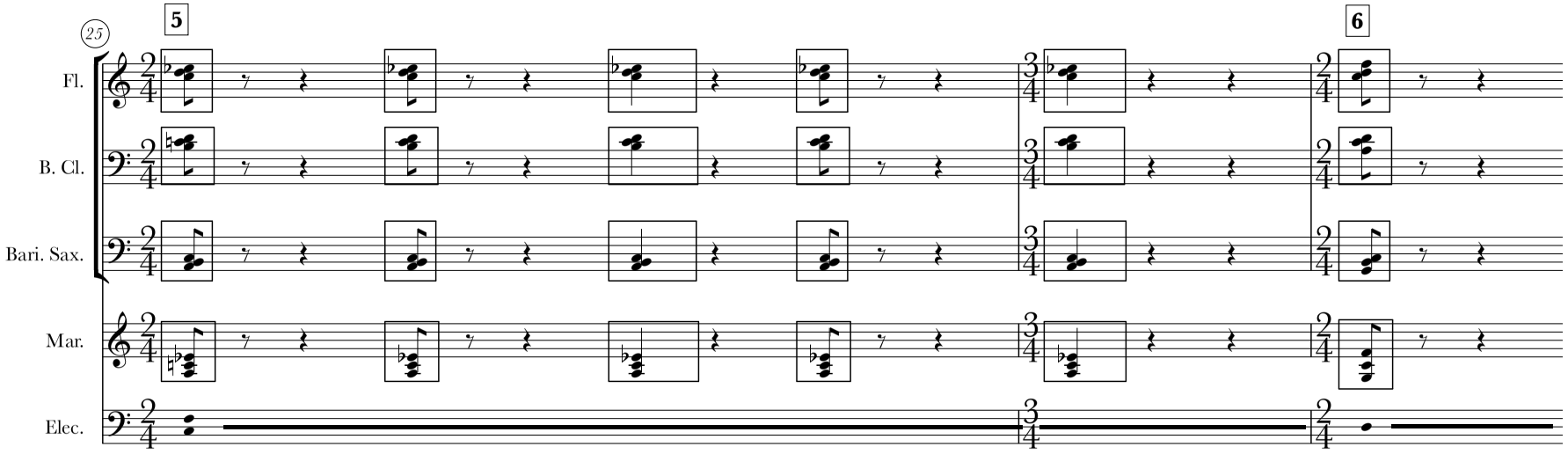



[0:30]
3
13
Fl.
B. Cl.
Bari. Sax.
Mar.
Elec.

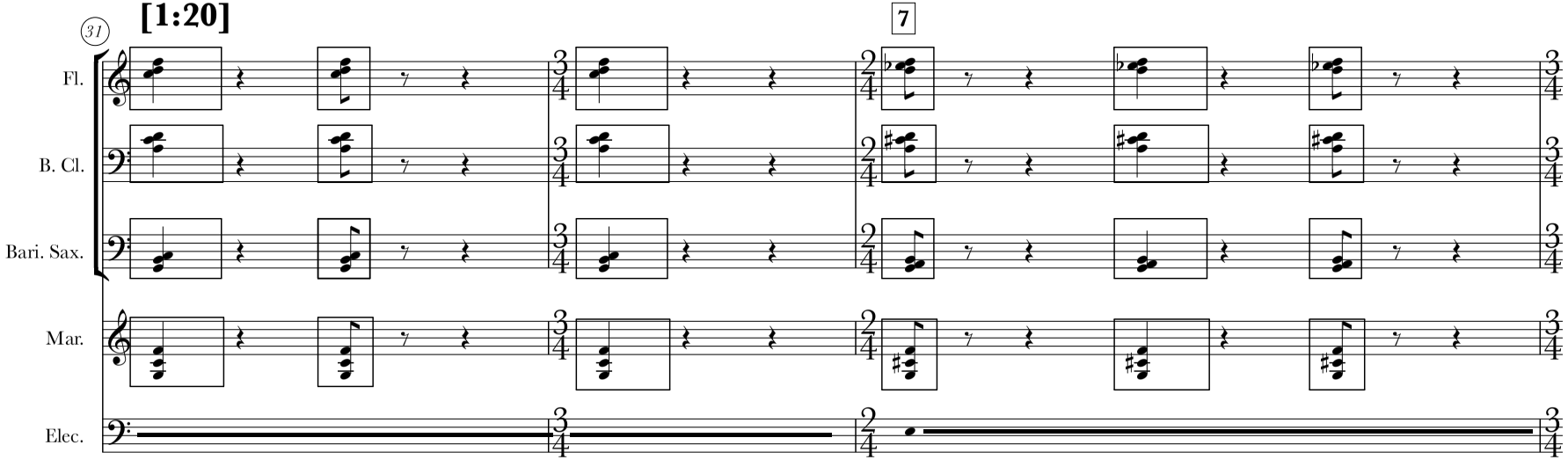

[0:45]
4
19
Fl.
B. Cl.
Bari. Sax.
Mar.
(Higher pitches continue)
Elec.

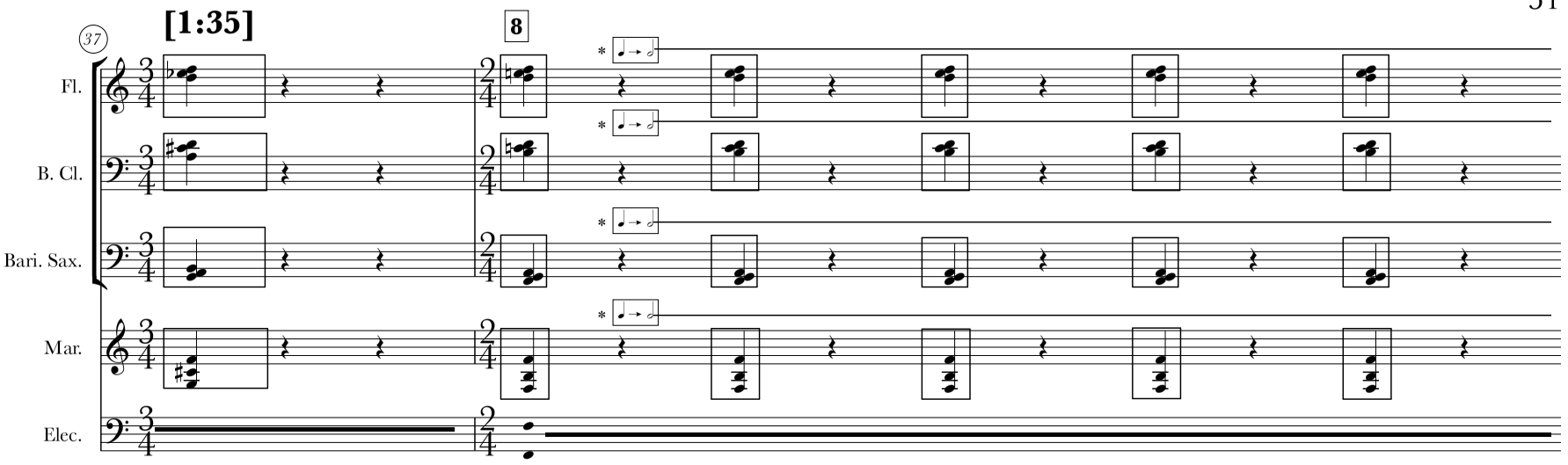
30

[1:00]

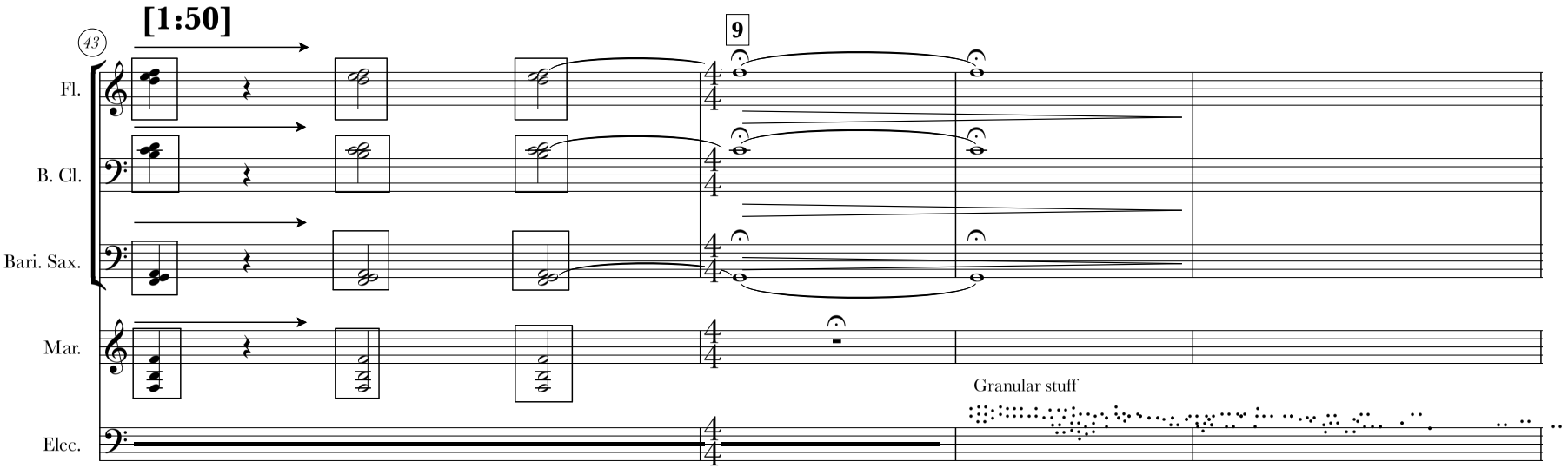


[1:20]



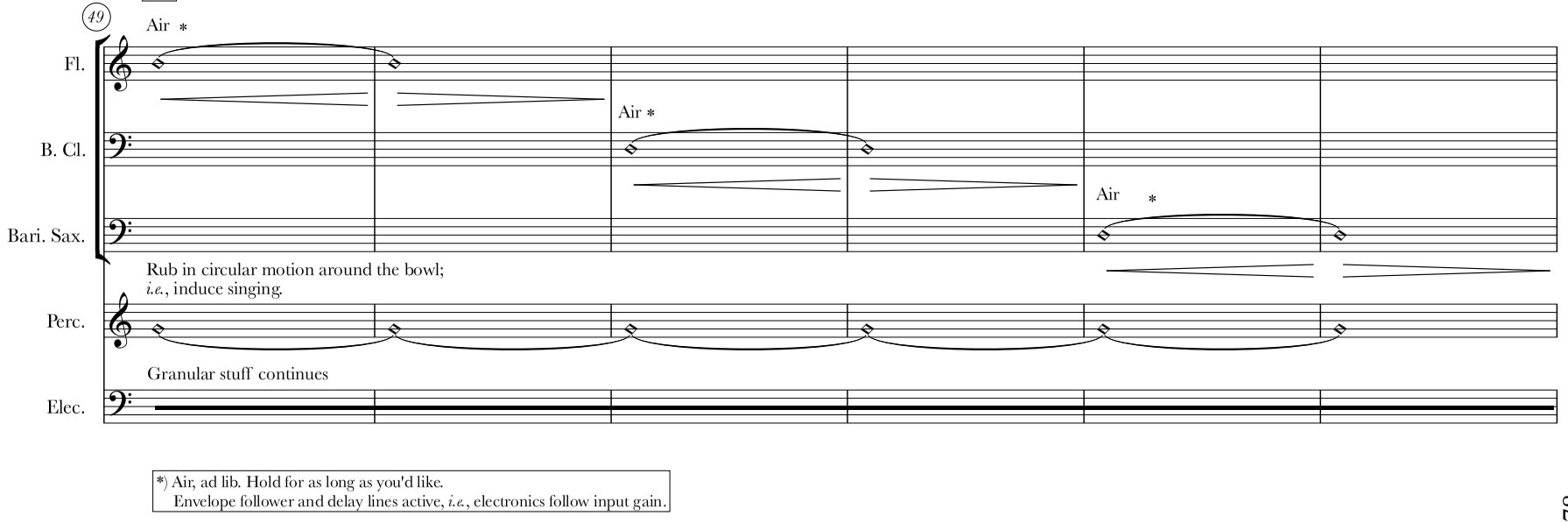


*) Individual notes growing longer and longer, overall length growing toward 𝅗𝅥

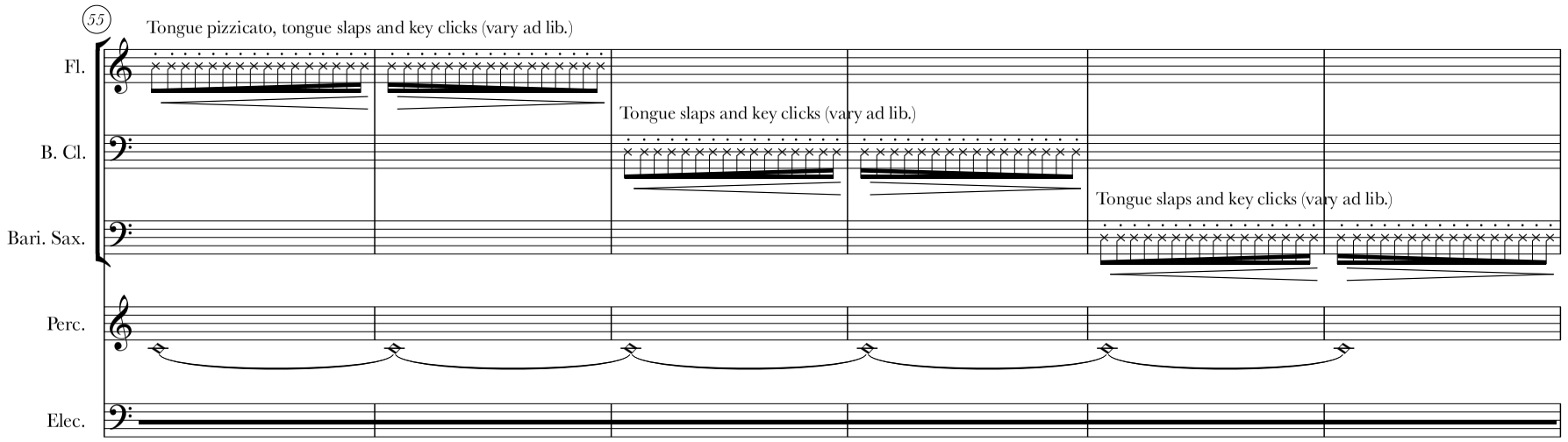


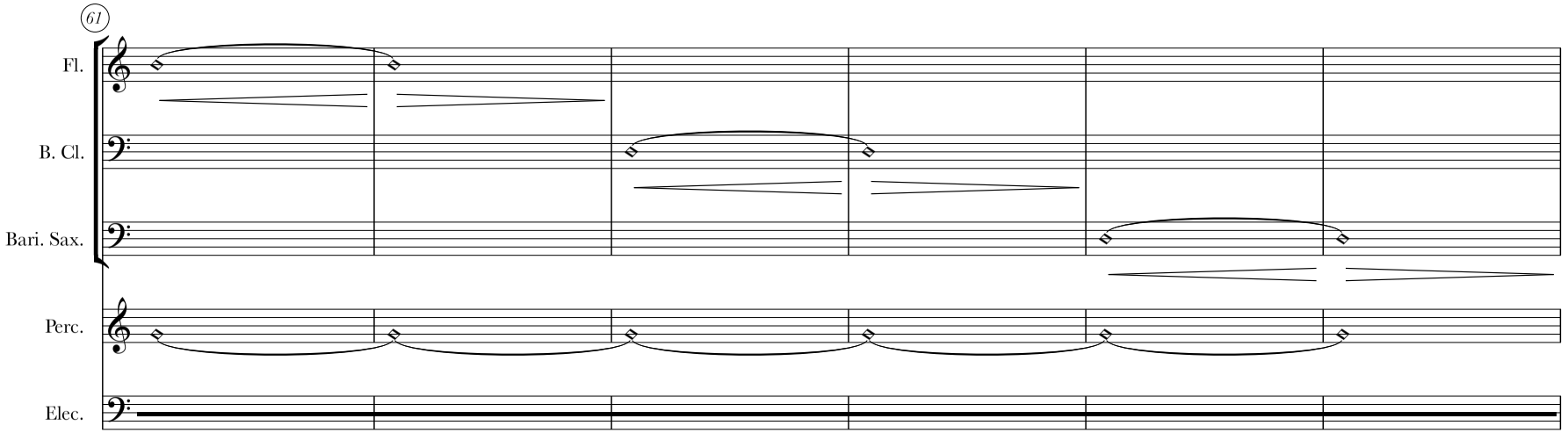
32 **[c. 2:25]**

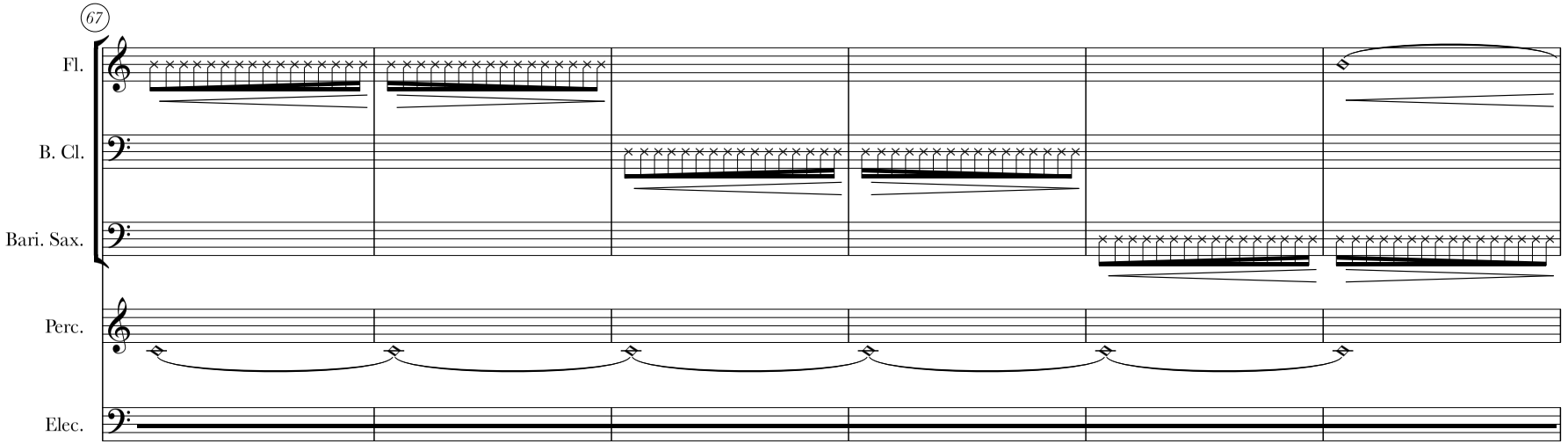
10



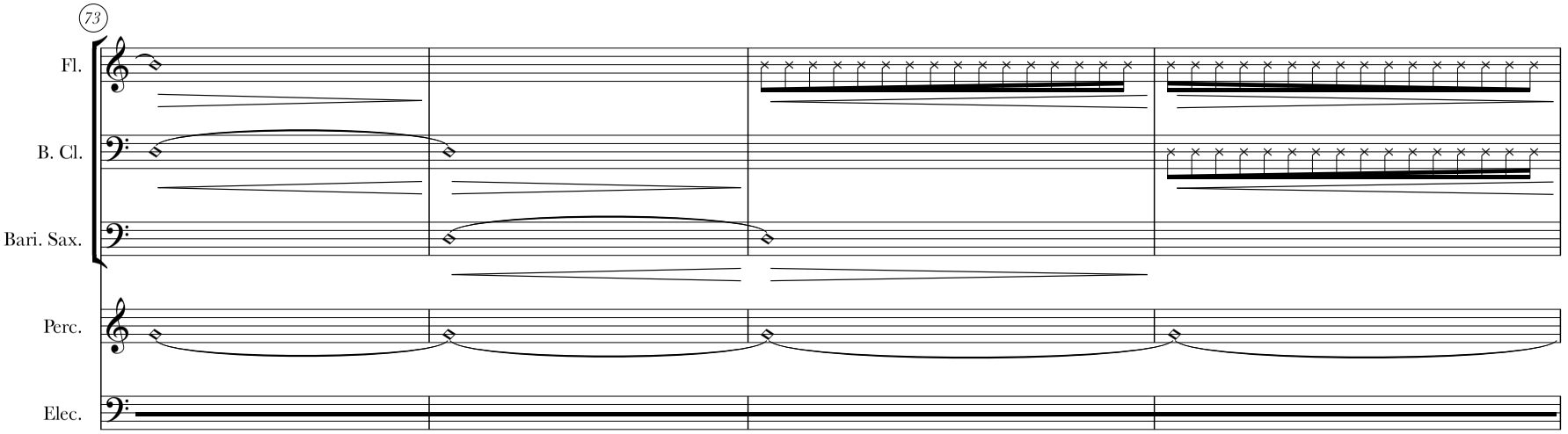
*) Air, ad lib. Hold for as long as you'd like.
Envelope follower and delay lines active, *i.e.*, electronics follow input gain.

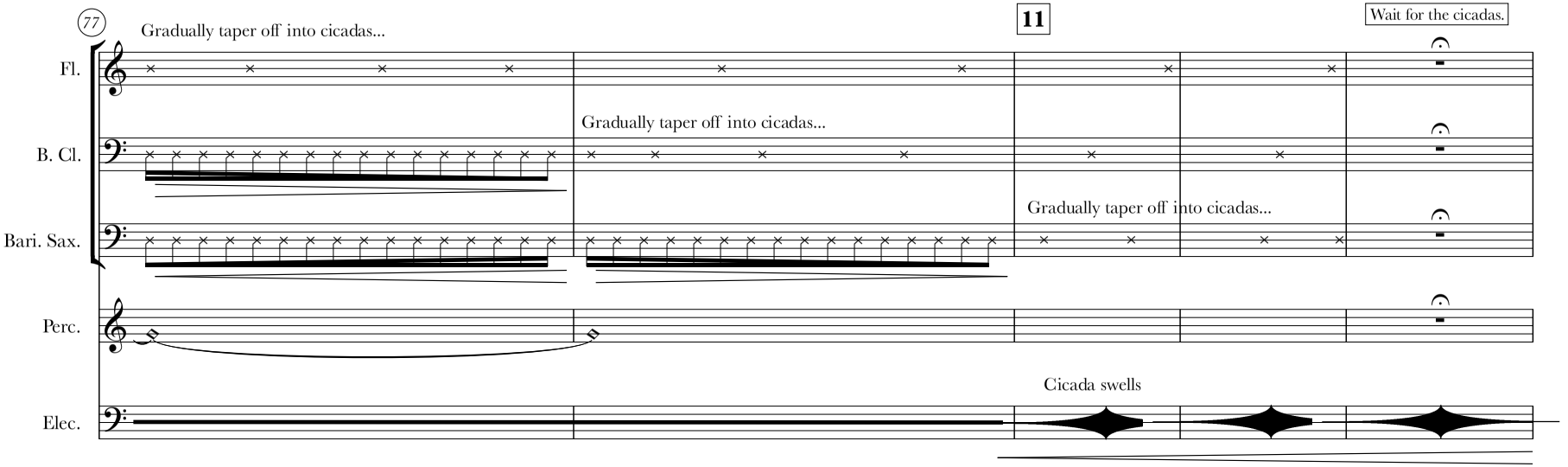



61
Fl.
B. Cl.
Bari. Sax.
Perc.
Elec.


67
Fl.
B. Cl.
Bari. Sax.
Perc.
Elec.

34


73
Fl.
B. Cl.
Bari. Sax.
Perc.
Elec.


77
Gradually taper off into cicadas...
11
Wait for the cicadas.
Fl.
Gradually taper off into cicadas...
B. Cl.
Gradually taper off into cicadas...
Bari. Sax.
Perc.
Cicada swells
Elec.

Roughly one cicada swell per measure (♩ = c. 46)
Beginning of measure on nadir of swell

82

Fl.

B. Cl.

Bari. Sax.

Mar.

Elec.

pp

pp

pp

soft mallets

ppp

*) Vary intensity with the cicadas.
Each measure corresponds roughly to one cicada swell.
Take breaths as needed, only in between swells.
Note changes need not occur precisely in sync.

88

Fl.

B. Cl.

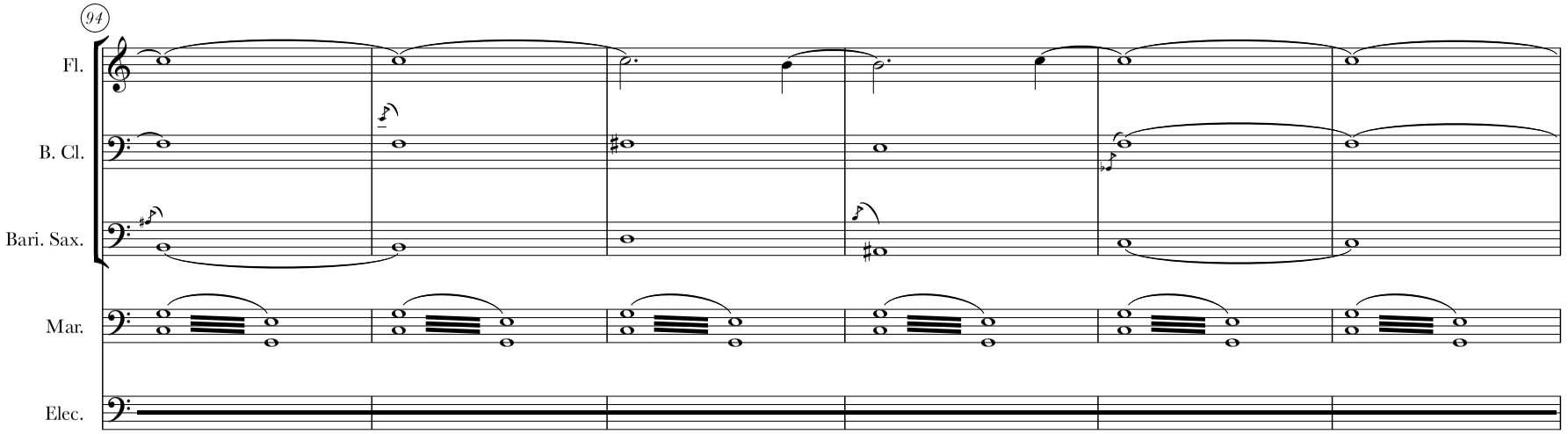
Bari. Sax.

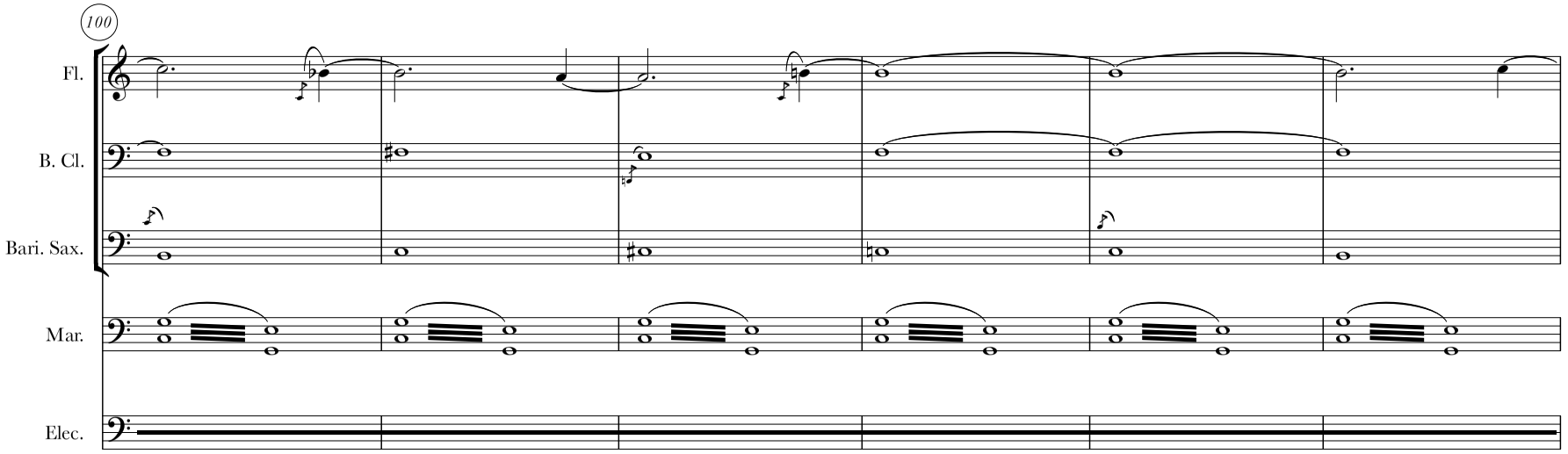
Mar.

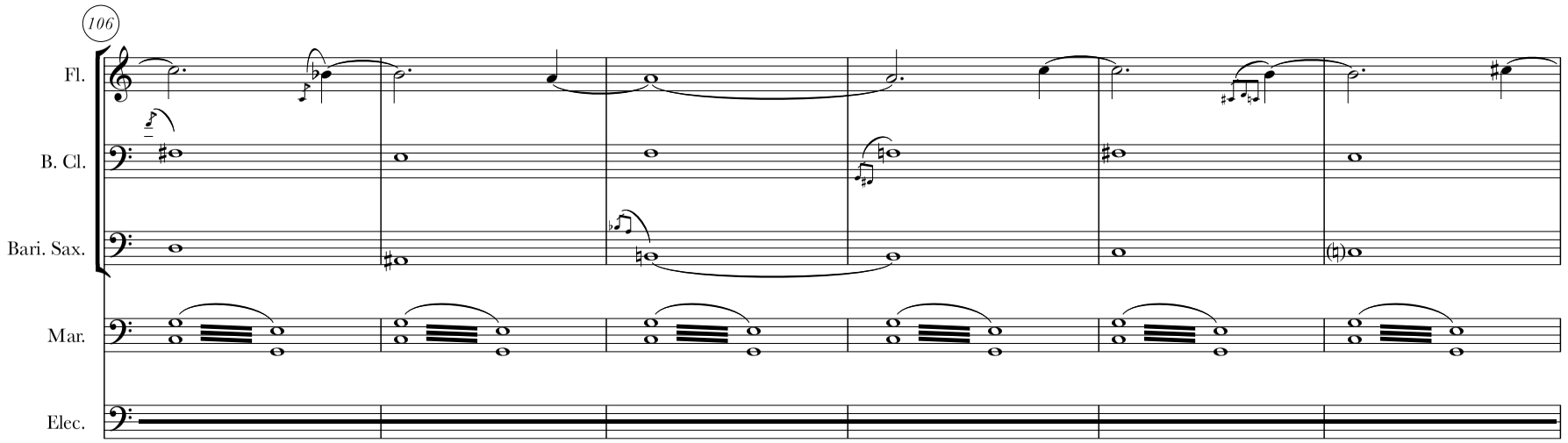
Cicadas continue

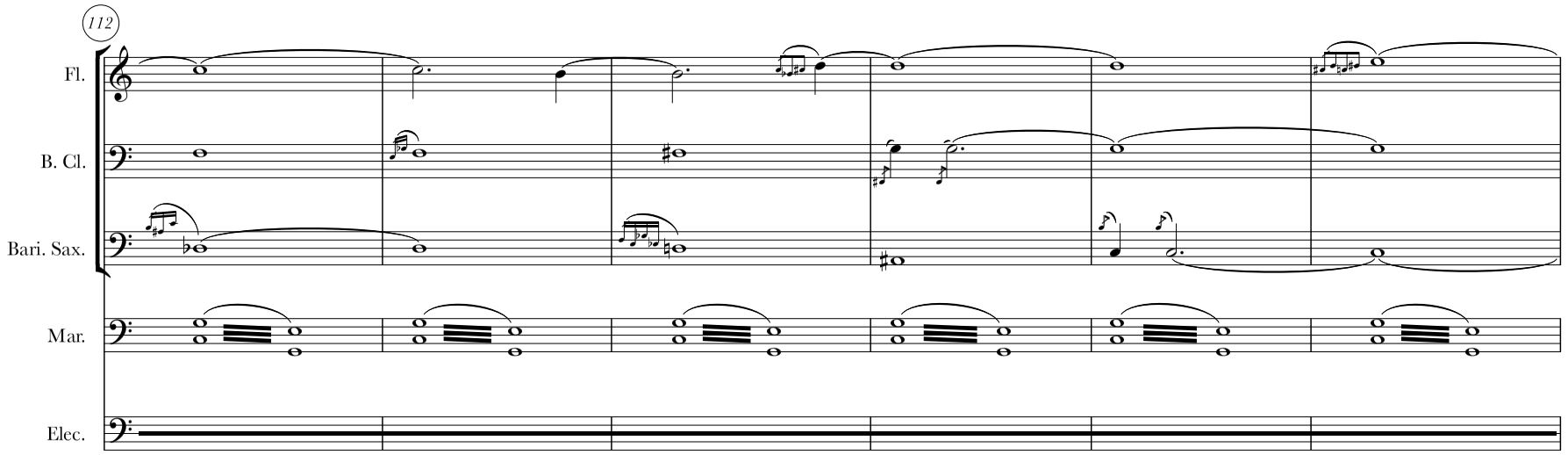
Elec.

36

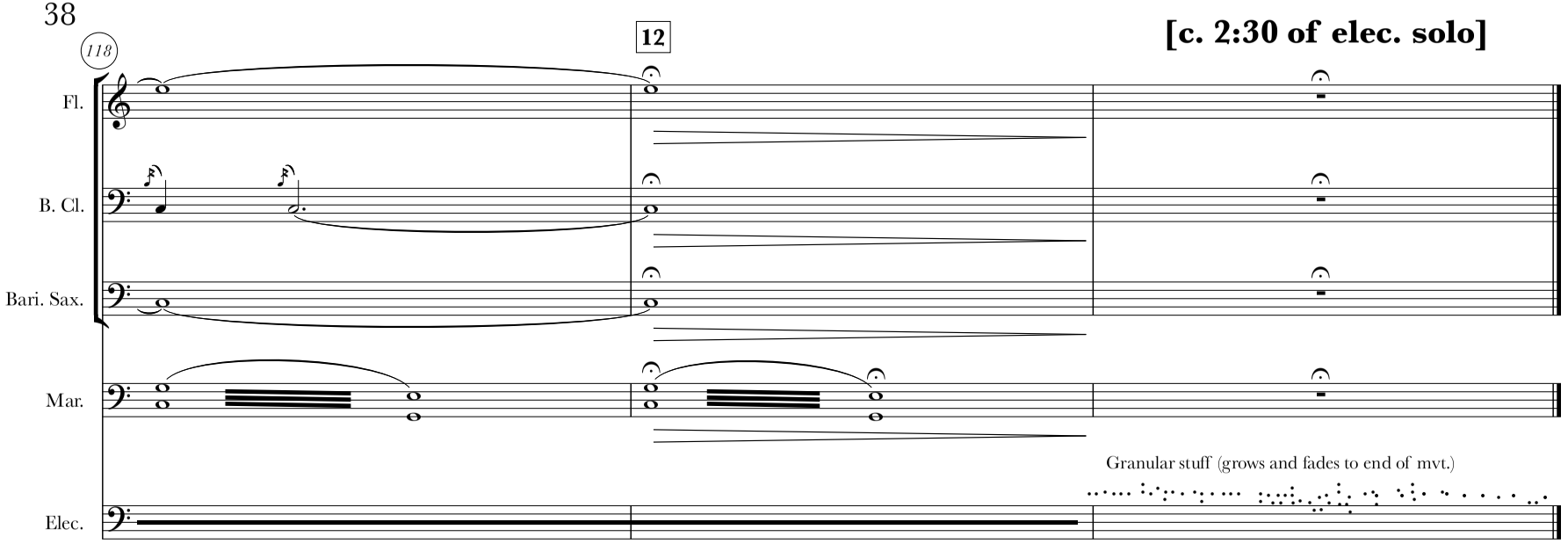




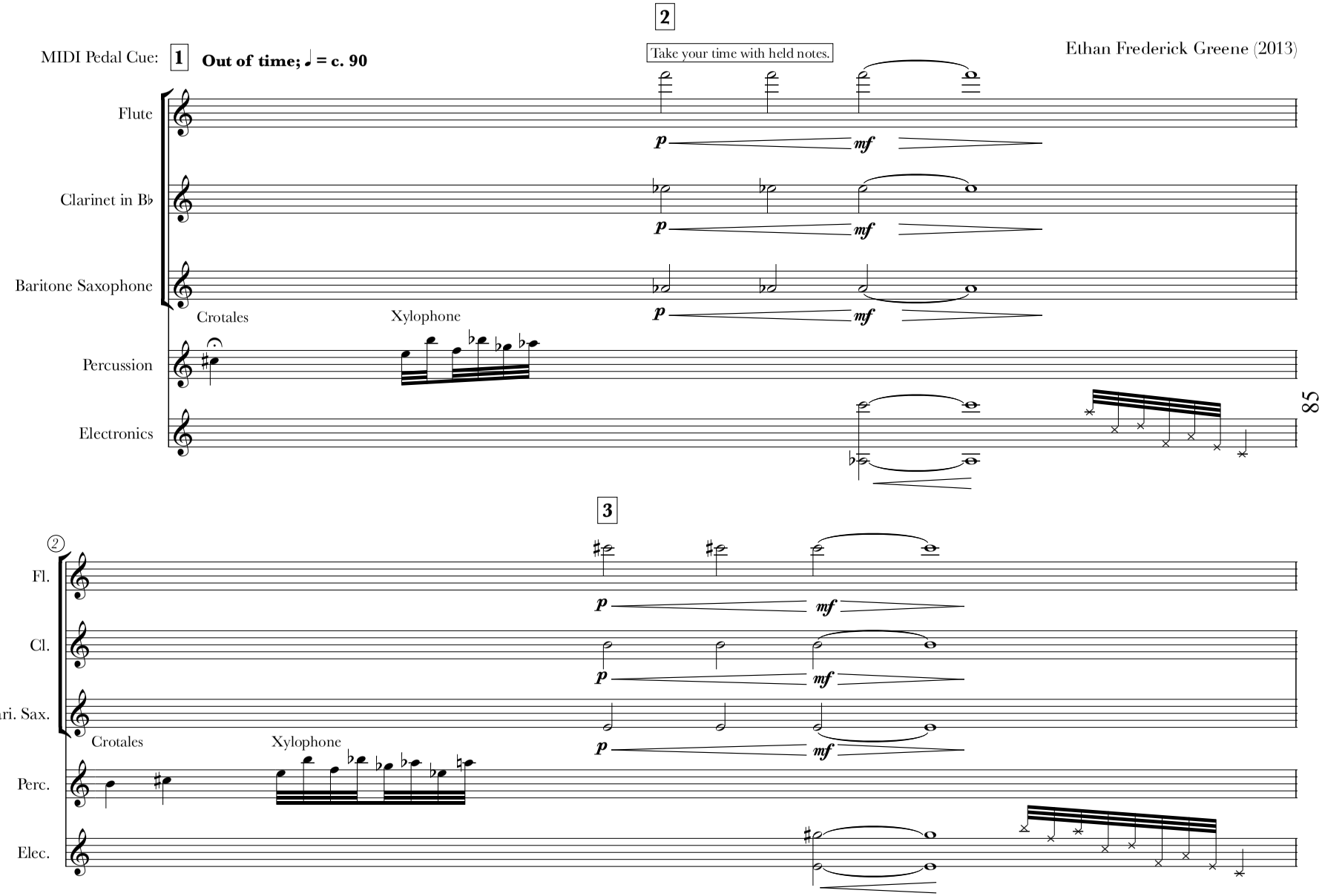

106
Fl.
B. Cl.
Bari. Sax.
Mar.
Elec.

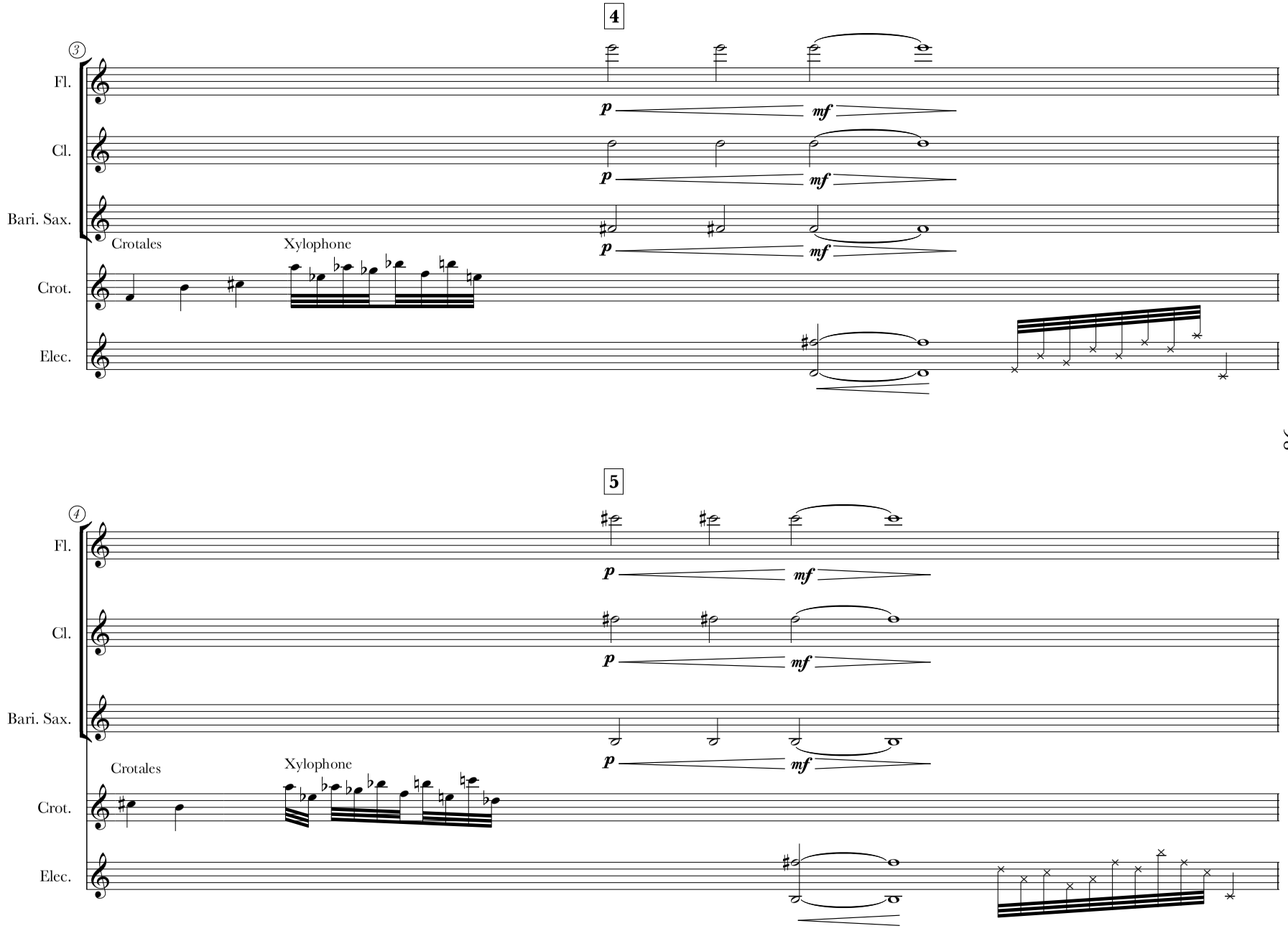

112
Fl.
B. Cl.
Bari. Sax.
Mar.
Elec.

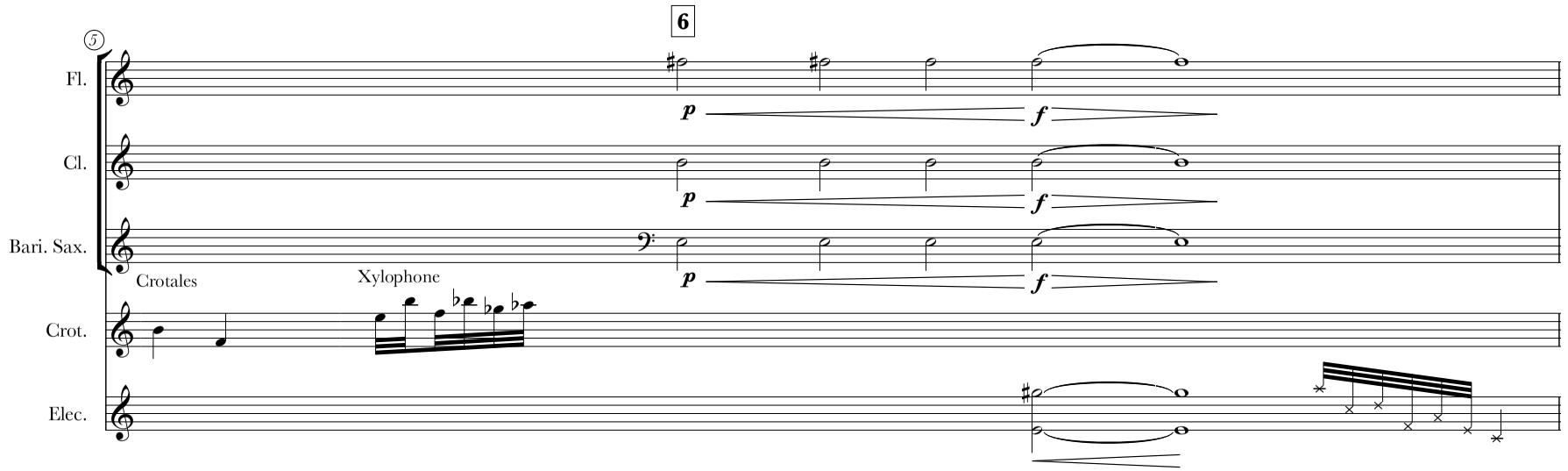
38


118
12
[c. 2:30 of elec. solo]
Fl.
B. Cl.
Bari. Sax.
Mar.
Granular stuff (grows and fades to end of mvt.)
Elec.

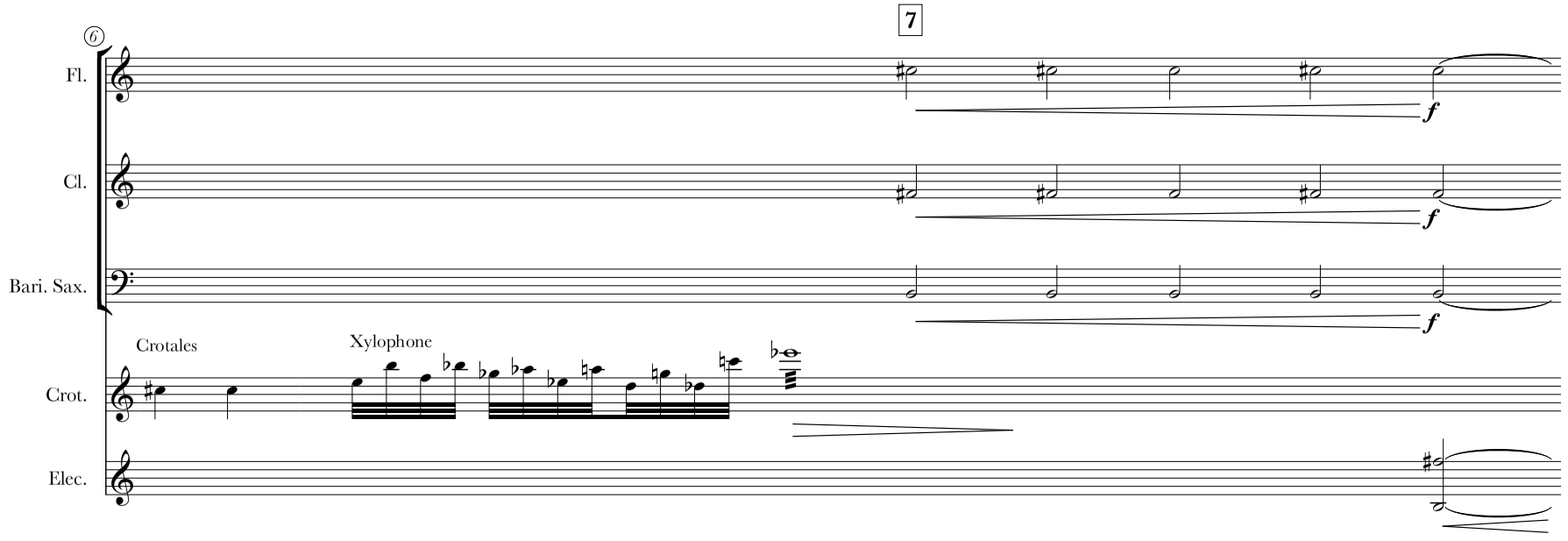
III.

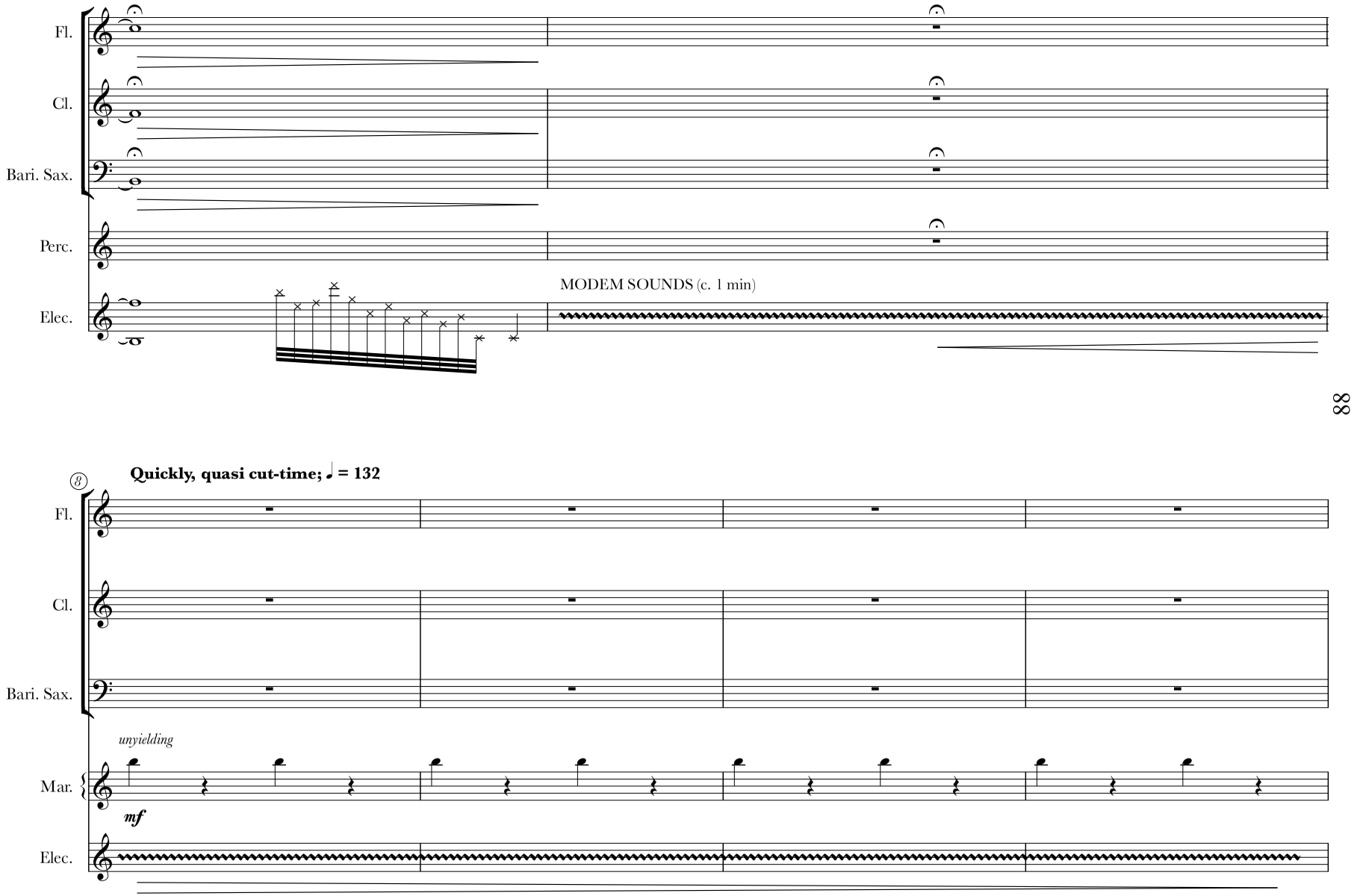

2
MIDI Pedal Cue: 1 Out of time; ♩ = c. 90
Take your time with held notes.
Ethan Frederick Greene (2013)
Flute
Clarinet in B♭
Baritone Saxophone
Crotales
Xylophone
Percussion
Electronics
p
mf
85
3
2
Fl.
Cl.
Bari. Sax.
Crotales
Xylophone
Perc.
Elec.

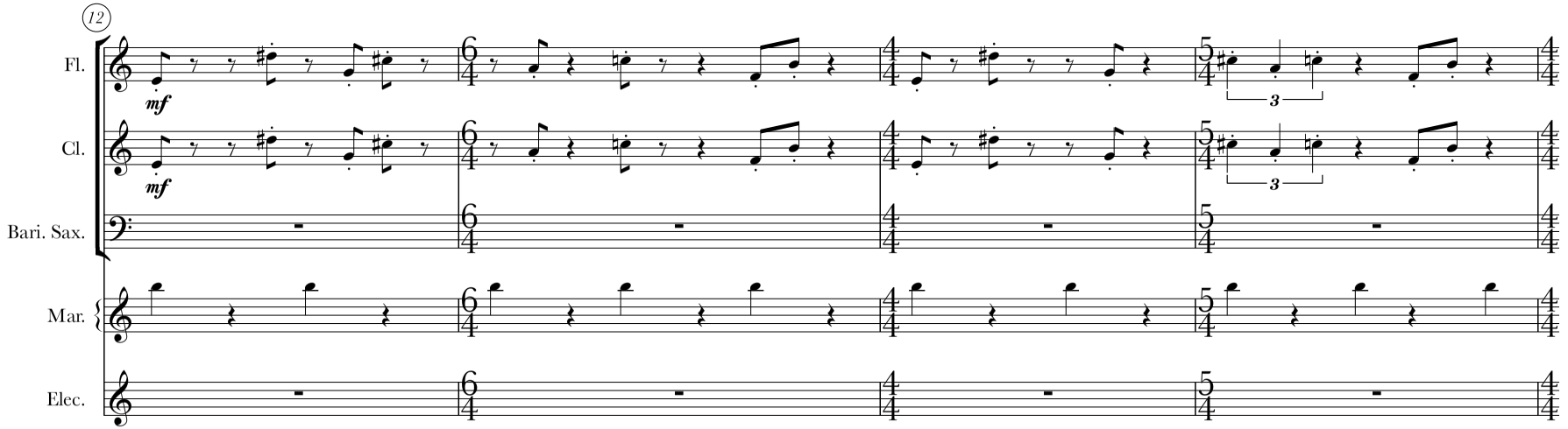

4
3
Fl.
Cl.
Bari. Sax.
Crotales
Xylophone
Crot.
Elec.
p
mf
5
4
Fl.
Cl.
Bari. Sax.
Crotales
Xylophone
Crot.
Elec.
p
mf

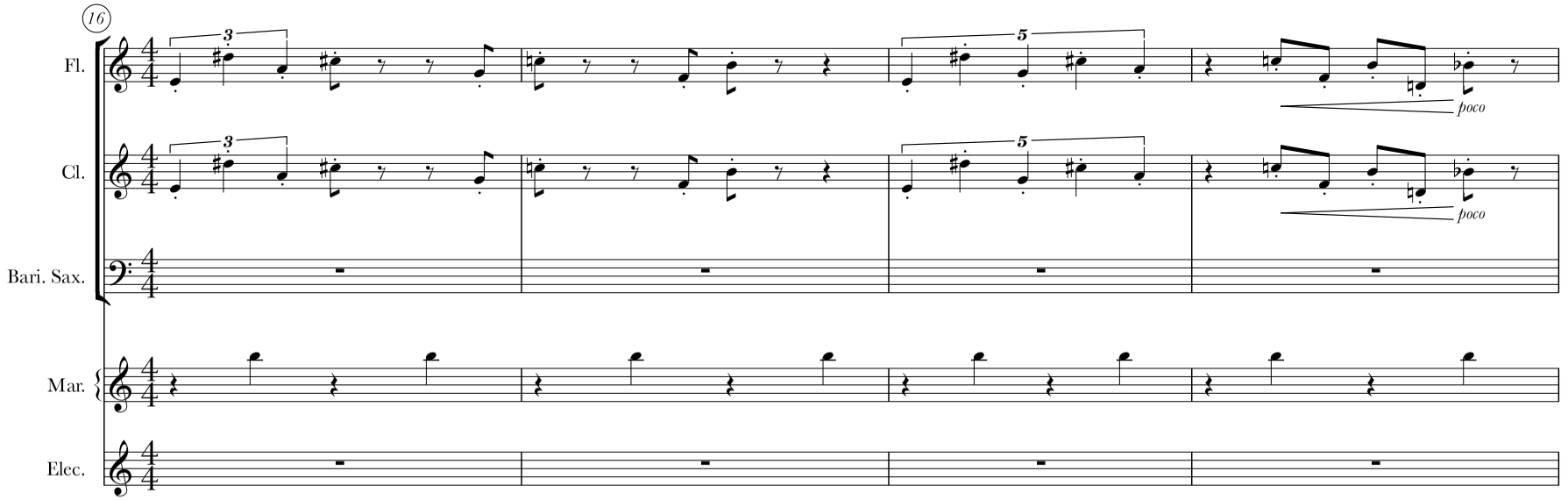

6
5
Fl.
Cl.
Bari. Sax.
Crotales
Xylophone
Crot.
Elec.
p
f

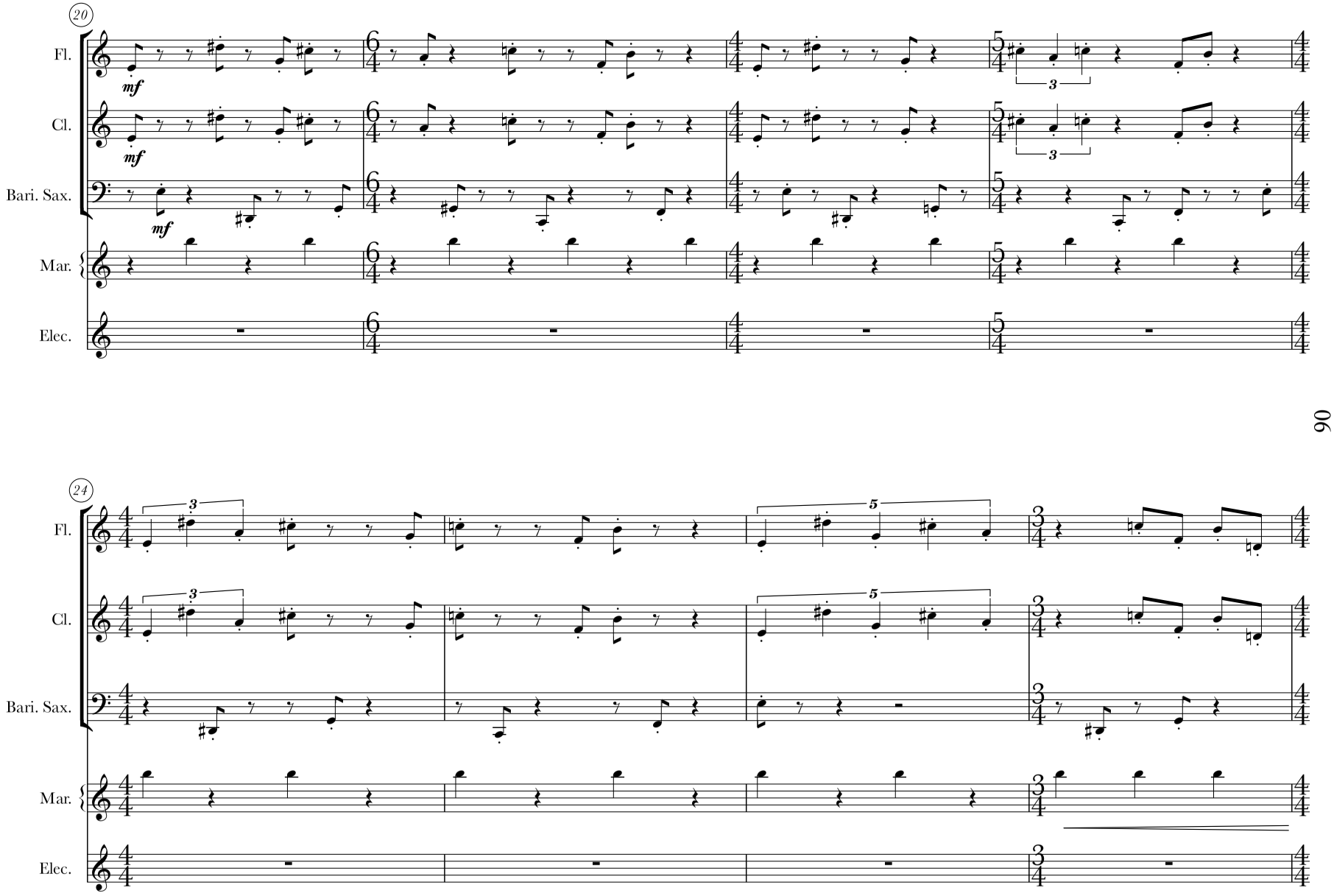
87

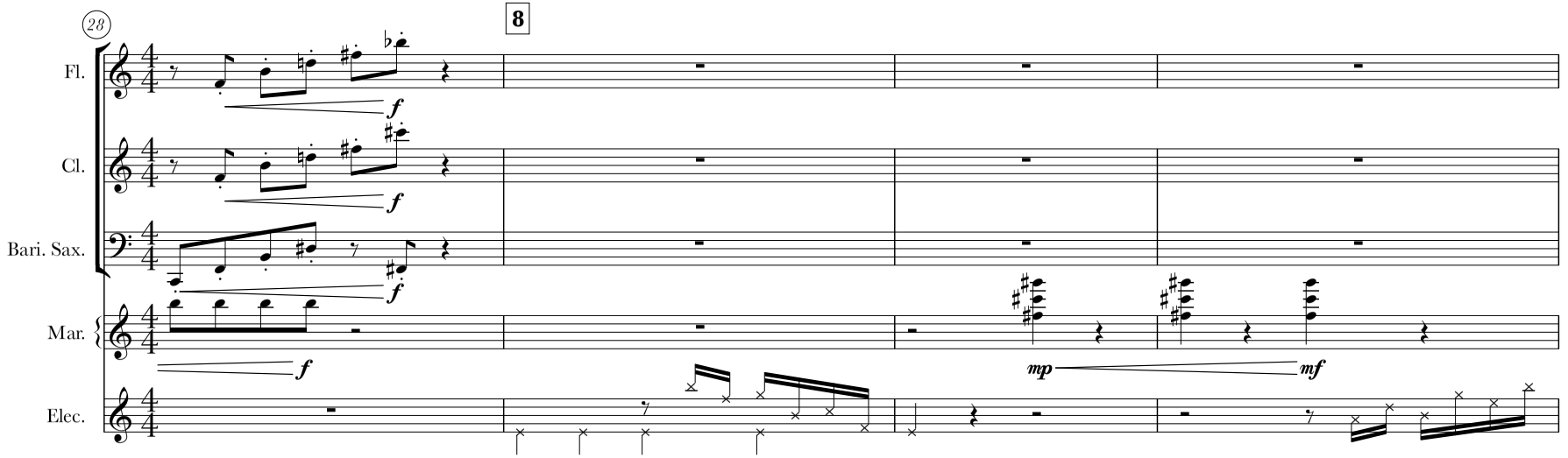

7
6
Fl.
Cl.
Bari. Sax.
Crotales
Xylophone
Crot.
Elec.
f

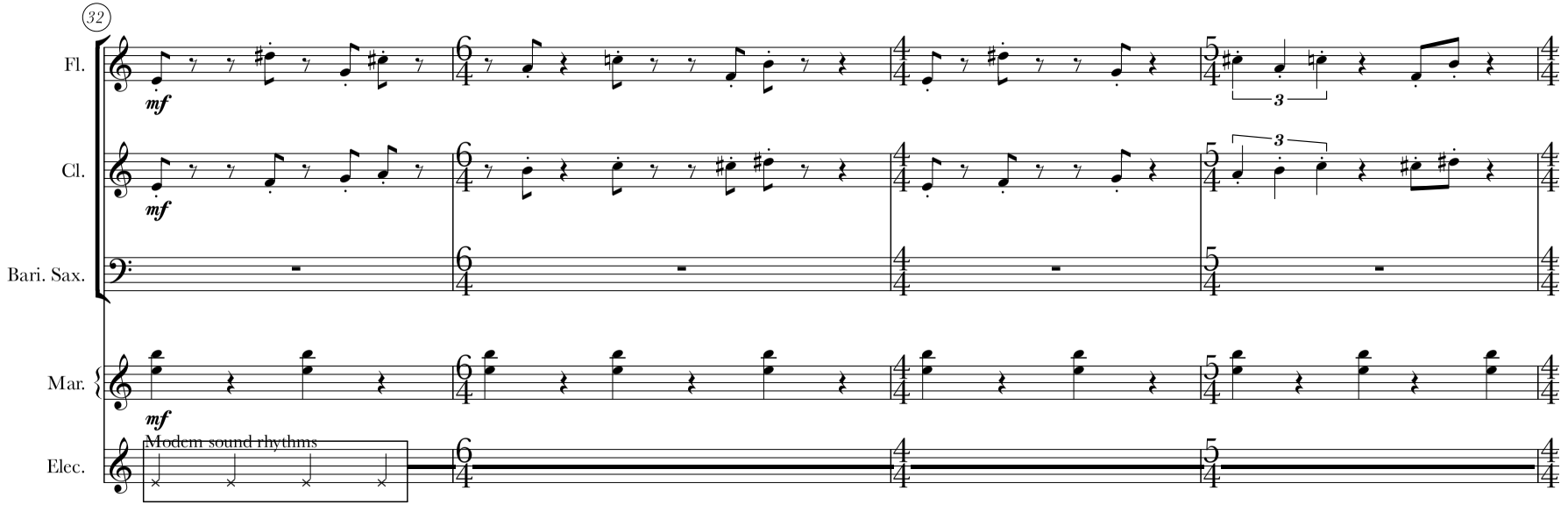

Fl.
Cl.
Bari. Sax.
Perc.
Elec.
MODEM SOUNDS (c. 1 min)
88
8
Quickly, quasi cut-time; ♩ = 132
Fl.
Cl.
Bari. Sax.
unyielding
Mar.
mf
Elec.

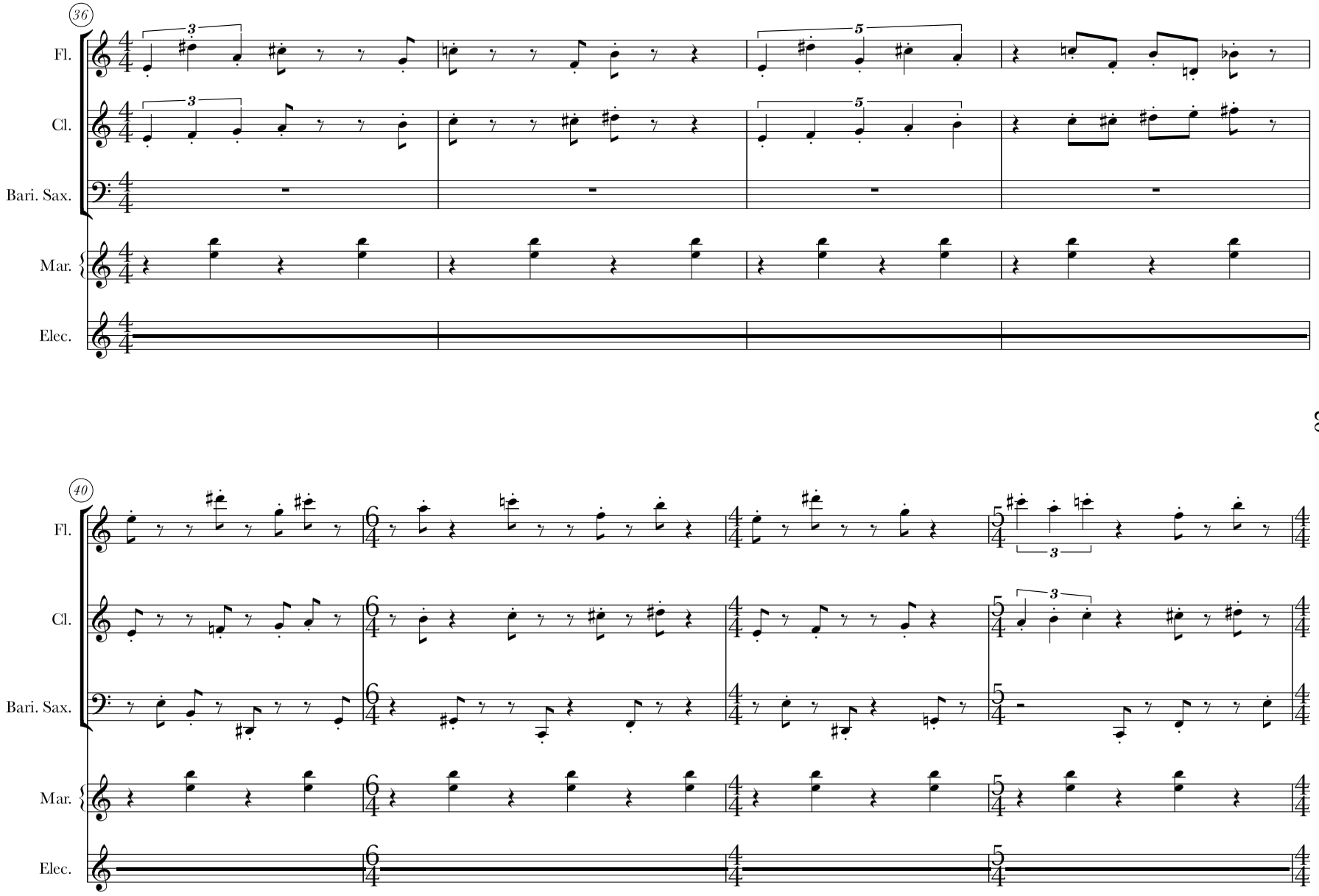

12
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
mf
mf
3
3

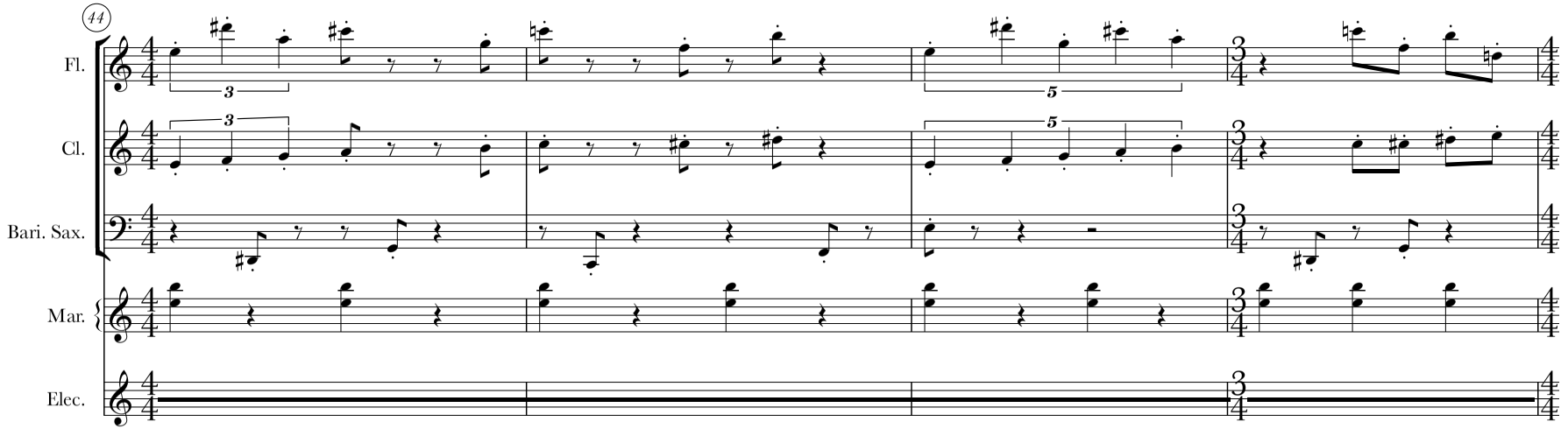

16
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
3
3
5
5
poco
poco

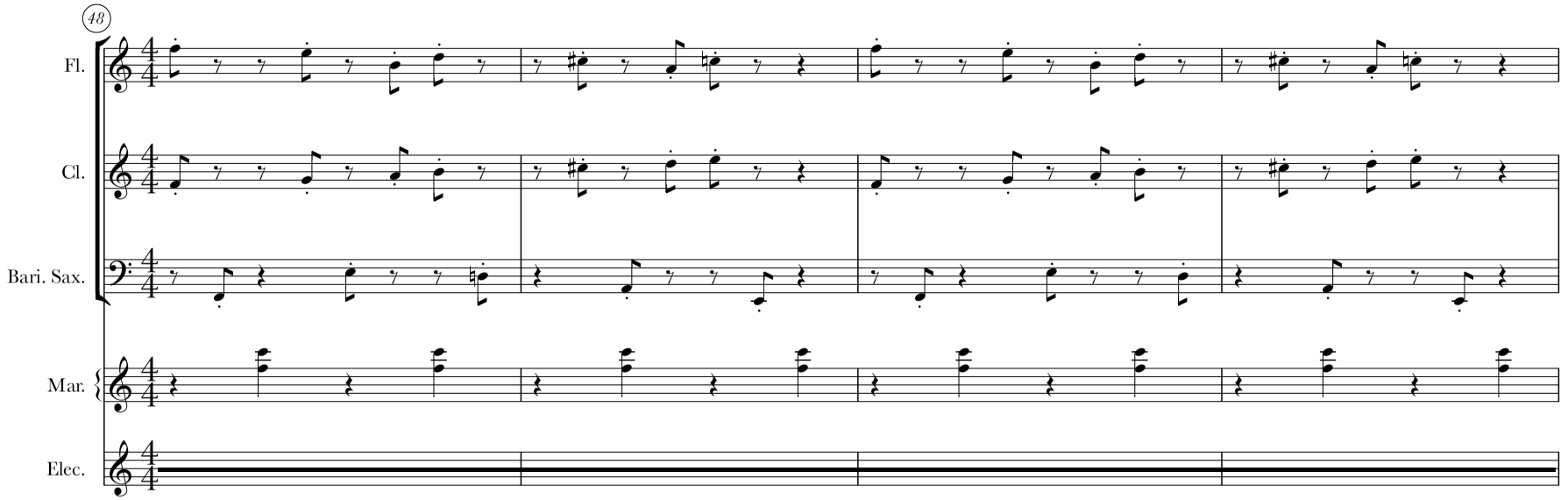

20
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
mf
mf
3
24
3
5

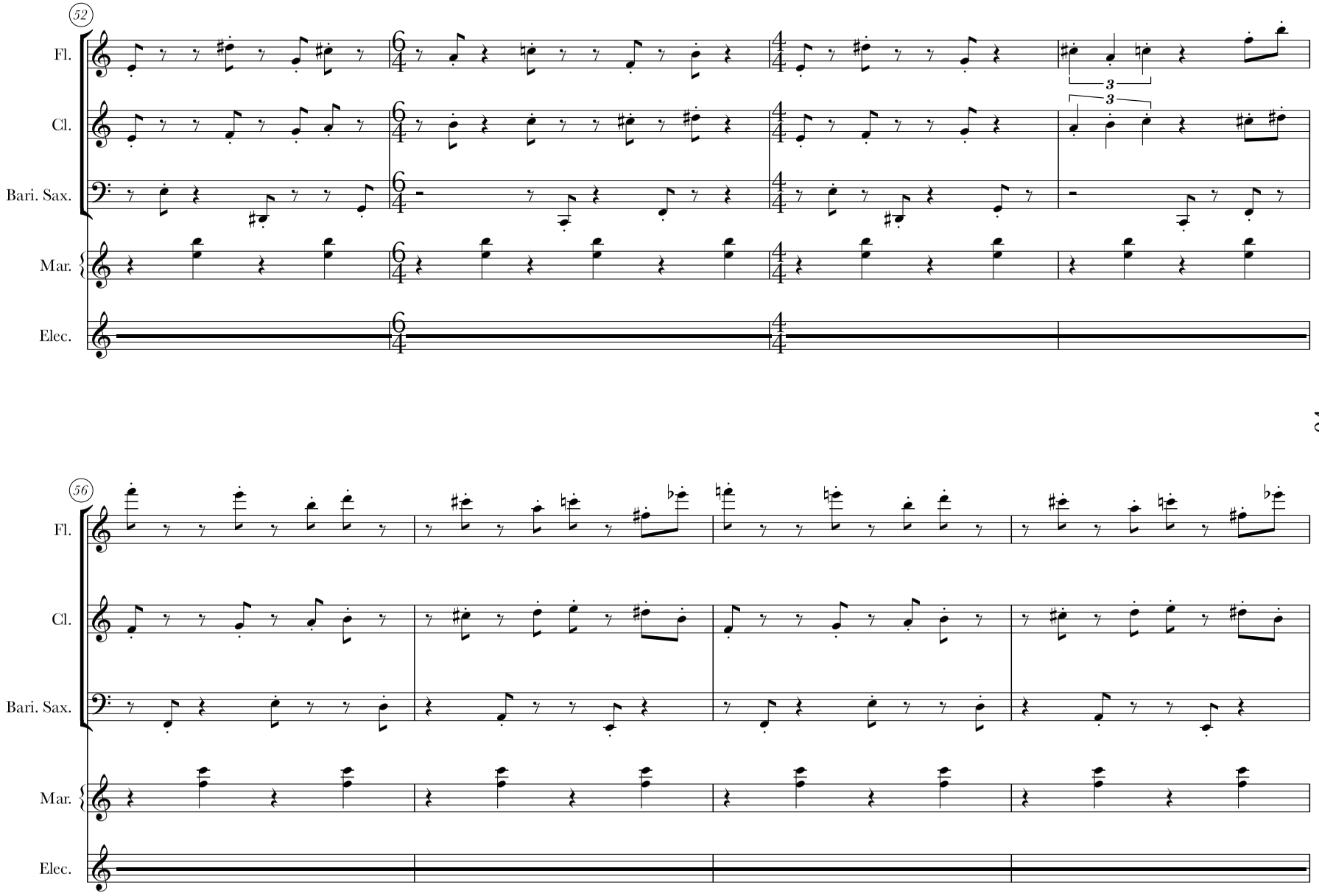

28
8
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
f
mp
mf

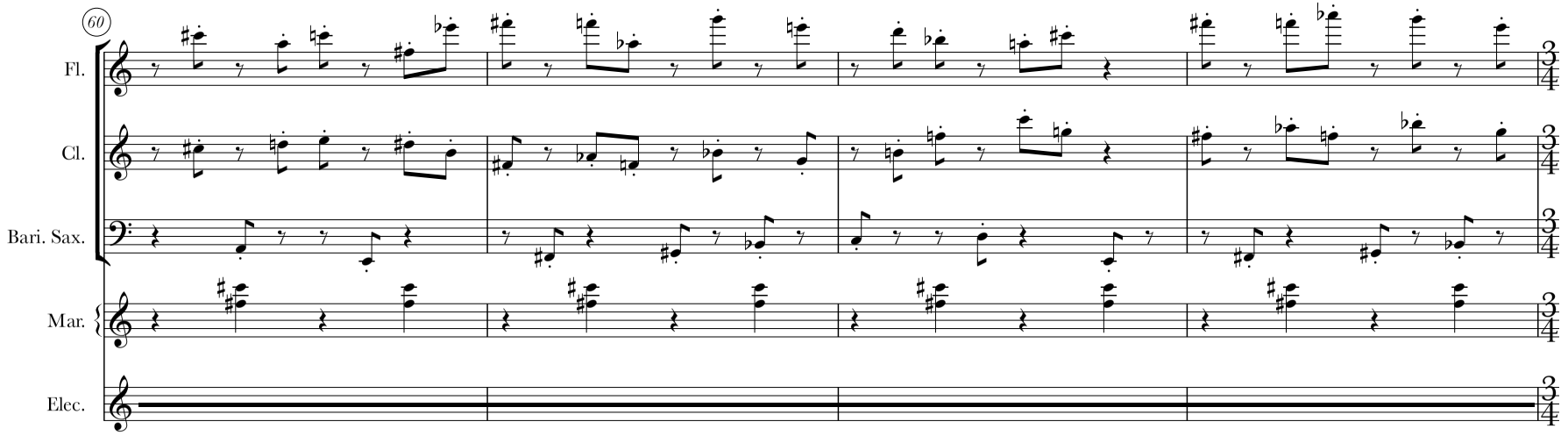

32
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
mf
3
Modern sound rhythms

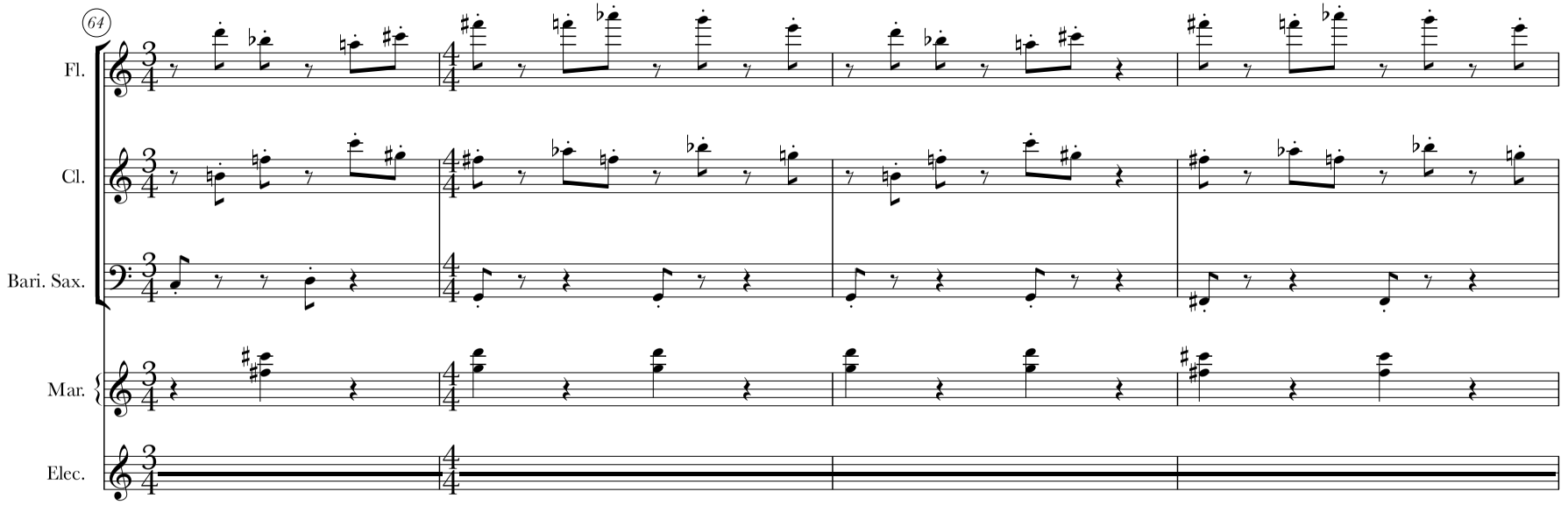

36
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
40
Fl.
Cl.
Bari. Sax.
Mar.
Elec.

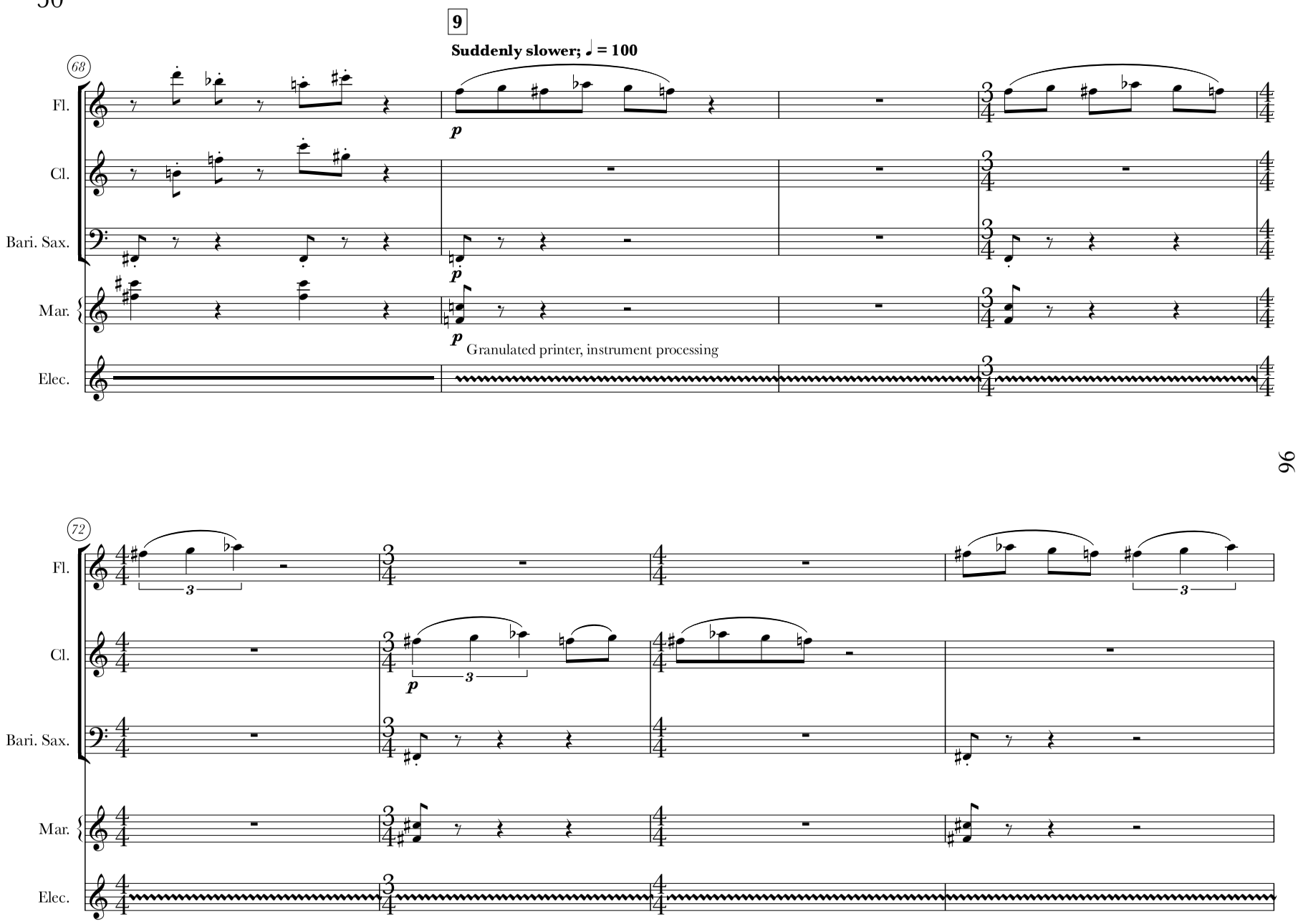

44
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
3
5

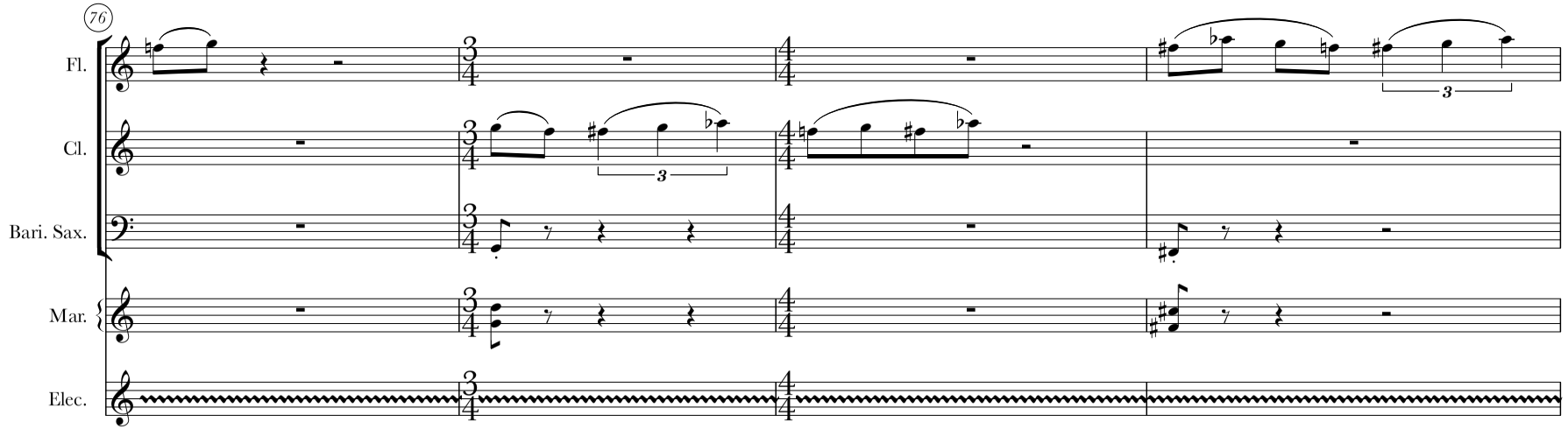

48
Fl.
Cl.
Bari. Sax.
Mar.
Elec.

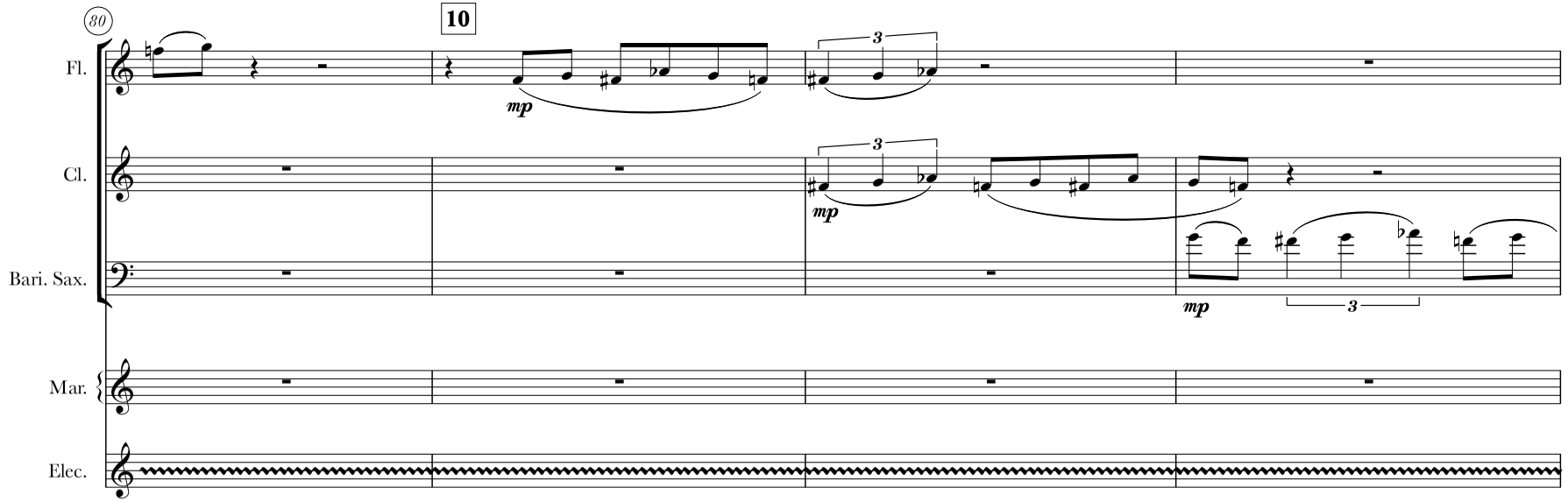

52
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
3
3
56
Fl.
Cl.
Bari. Sax.
Mar.
Elec.

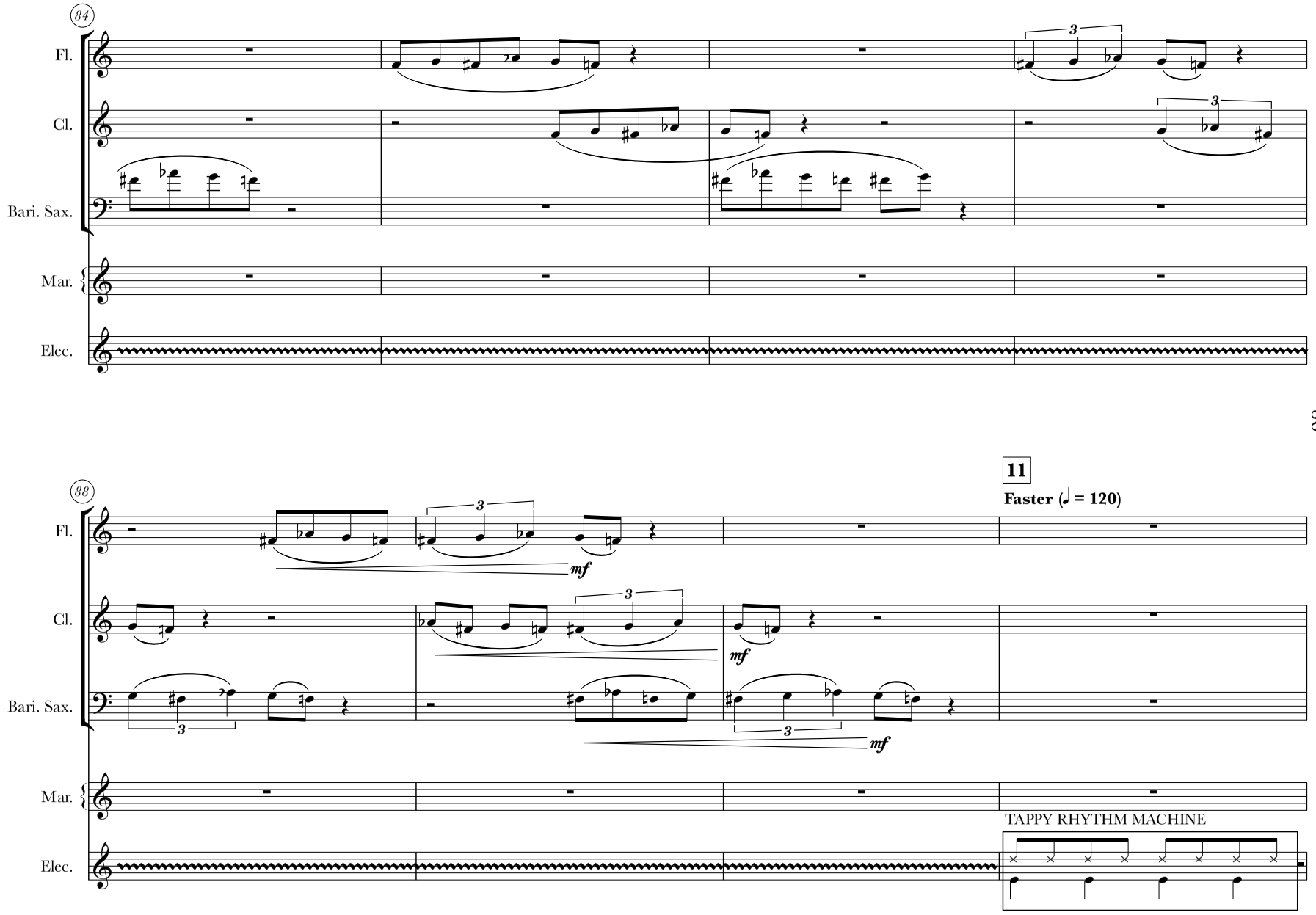

60
Fl.
Cl.
Bari. Sax.
Mar.
Elec.

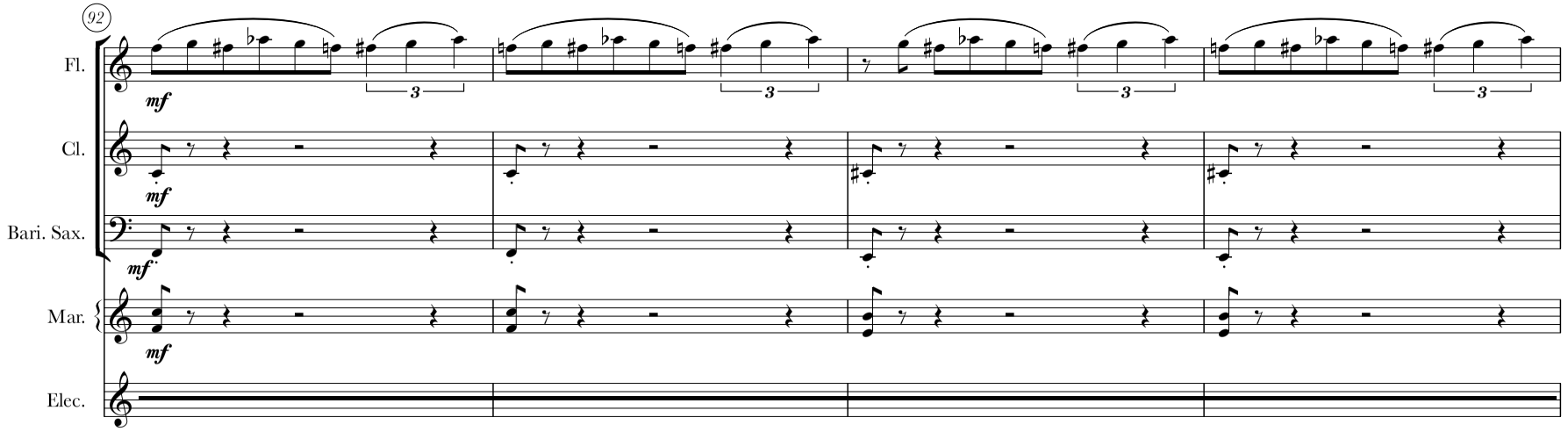

64
Fl.
Cl.
Bari. Sax.
Mar.
Elec.

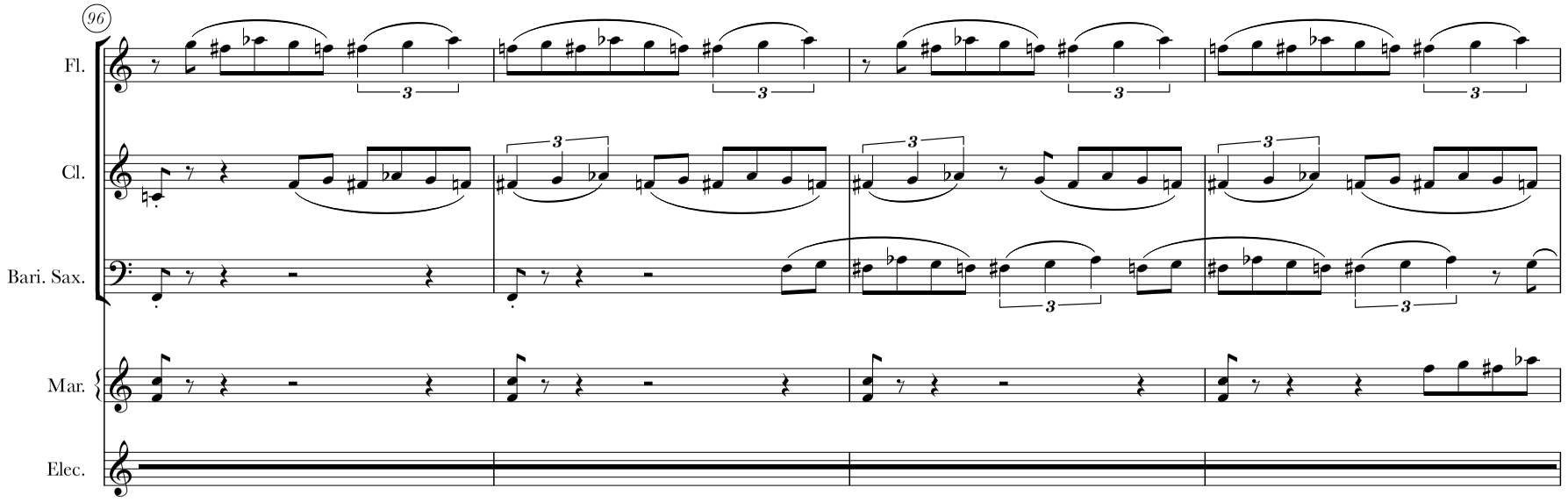

9
Suddenly slower; ♩ = 100
68
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
p
Granulated printer, instrument processing
72
3

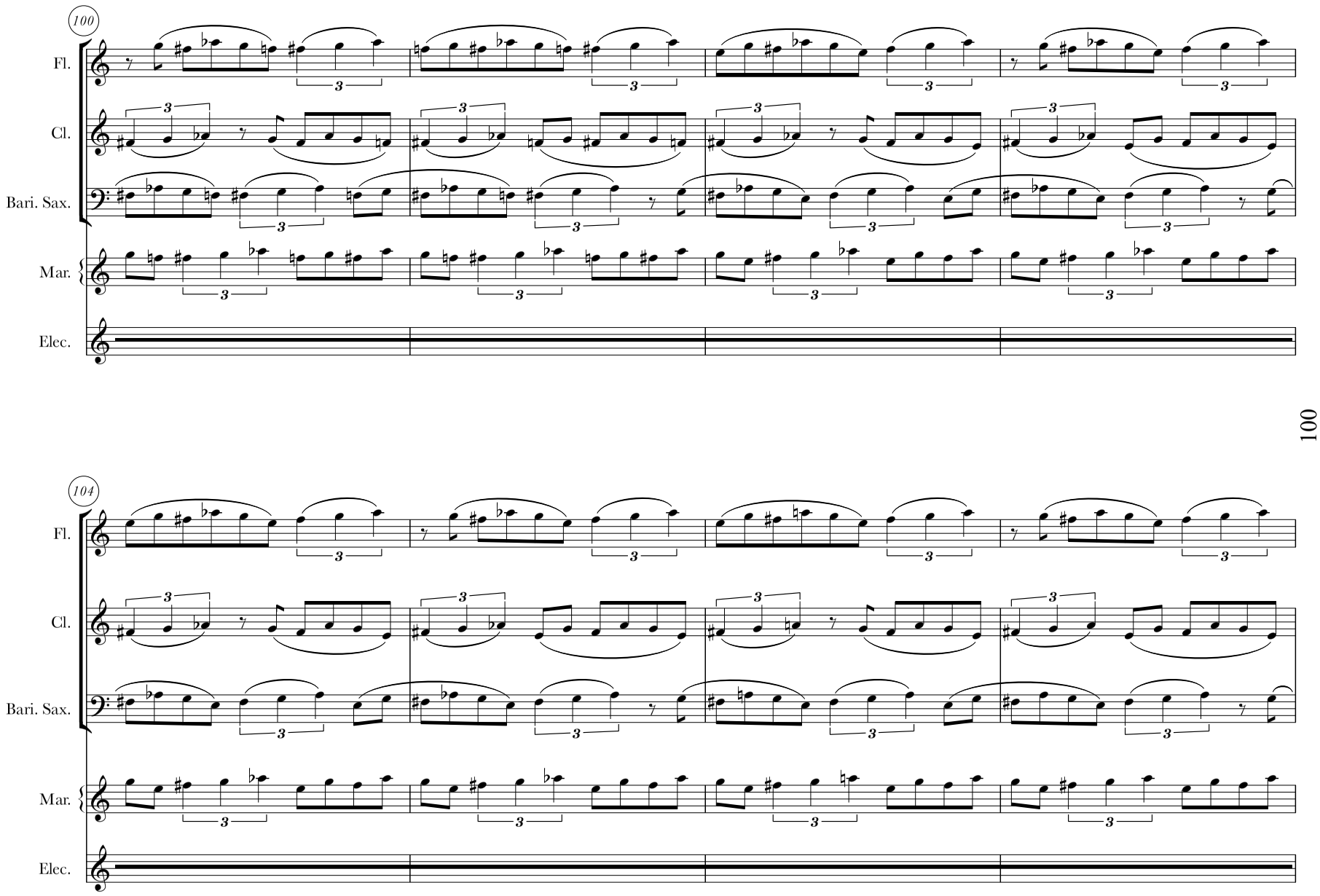

76
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
3
3

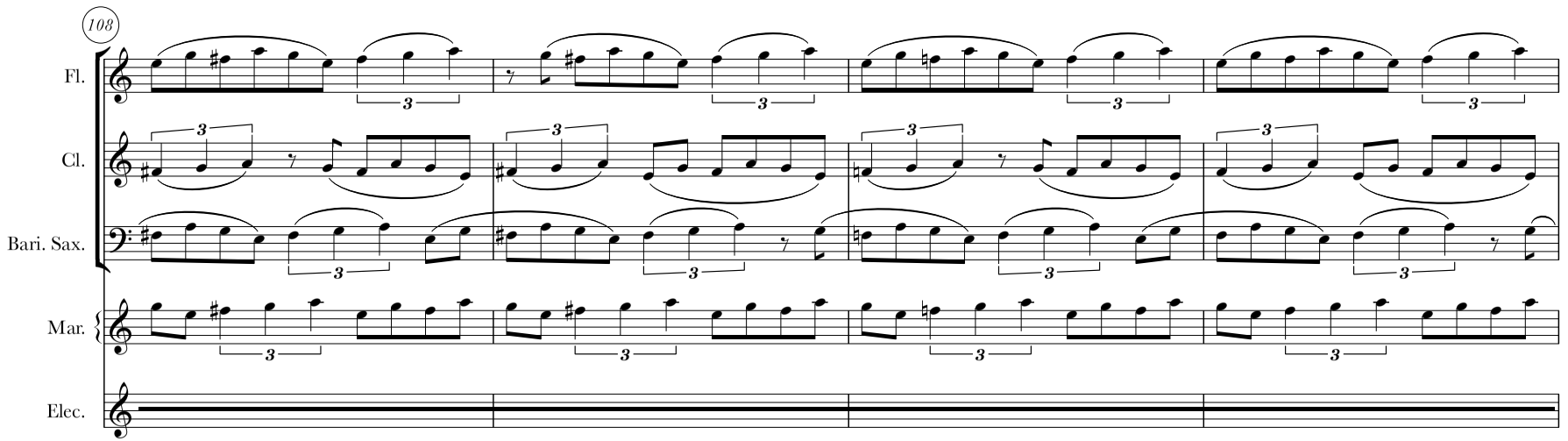

80
10
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
mp
3
3
mp
mp
3


84
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
88
11
Faster (♩ = 120)
mf
TAPPY RHYTHM MACHINE

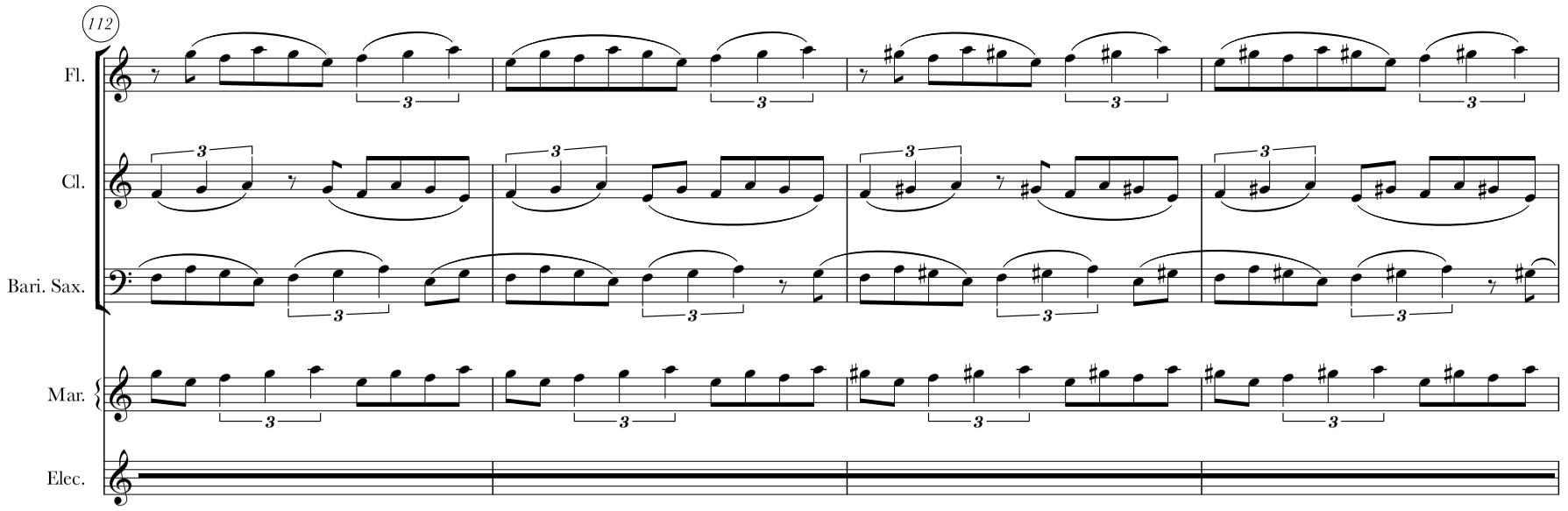

92
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
mf
3

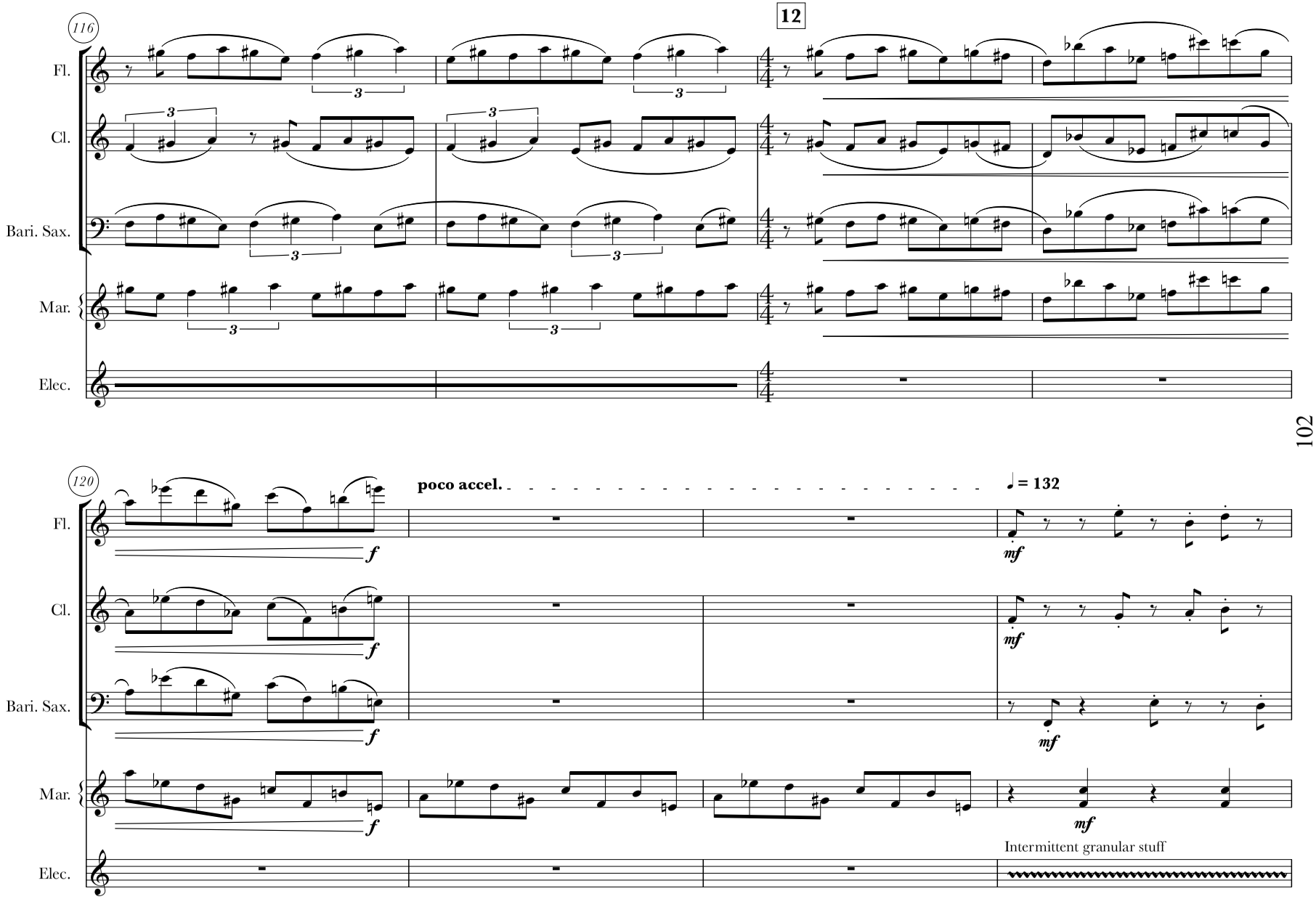

96
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
3

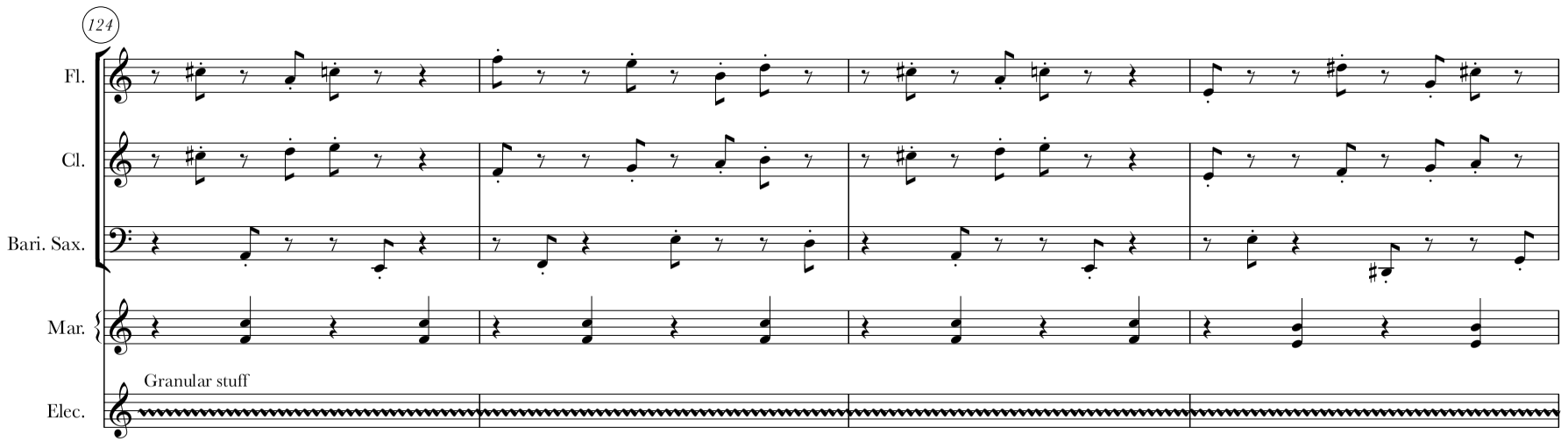

100
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
104
Fl.
Cl.
Bari. Sax.
Mar.
Elec.



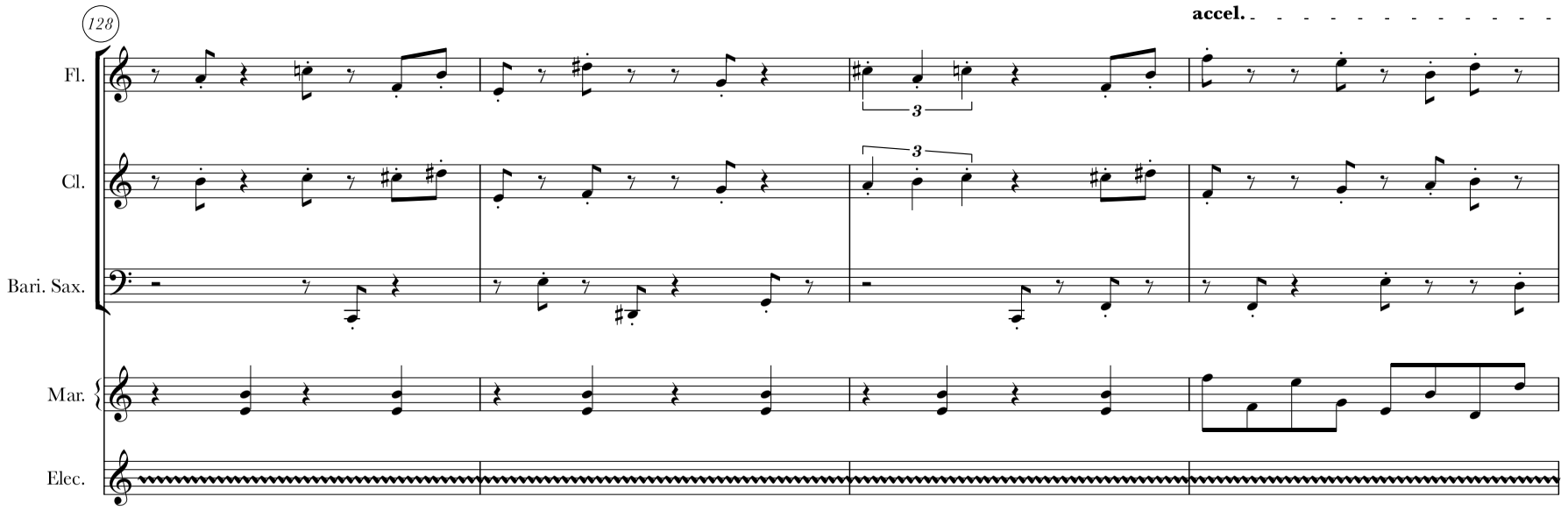
101

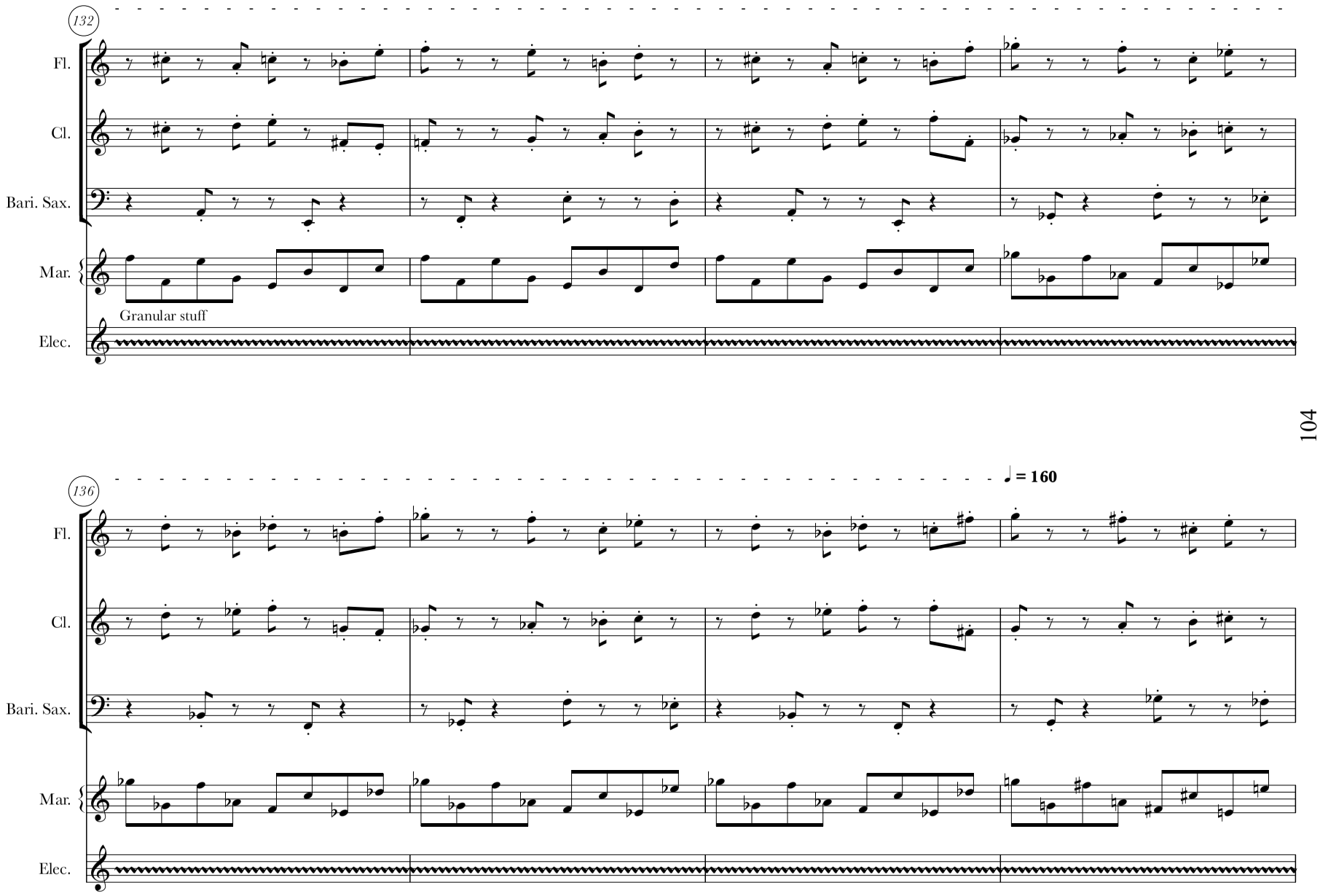


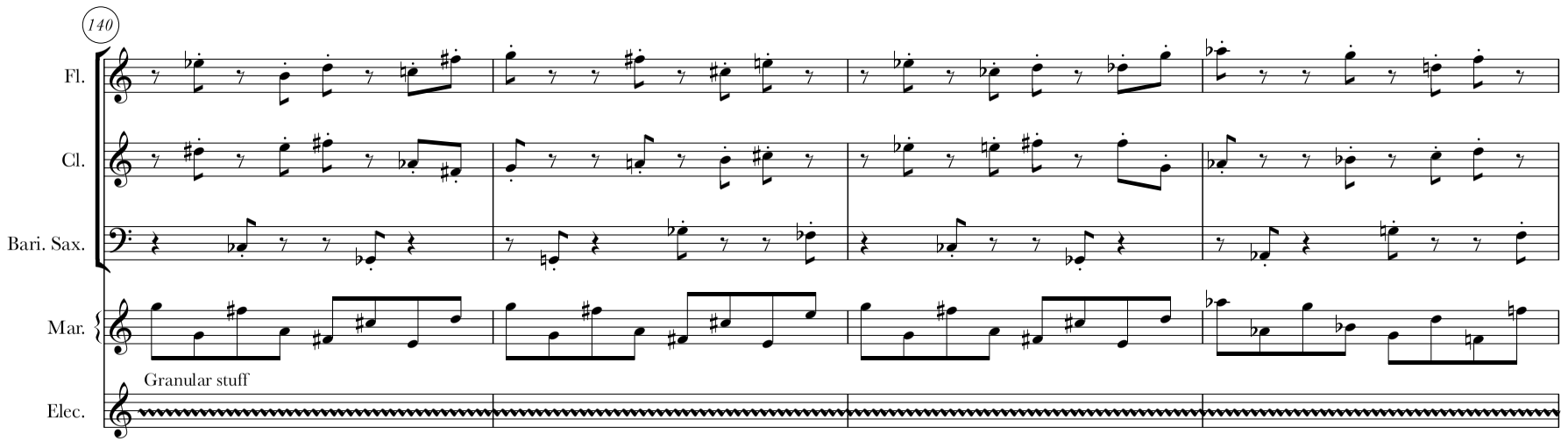

116
12
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
120
poco accel.
♩ = 132
f
mf
Intermittent granular stuff

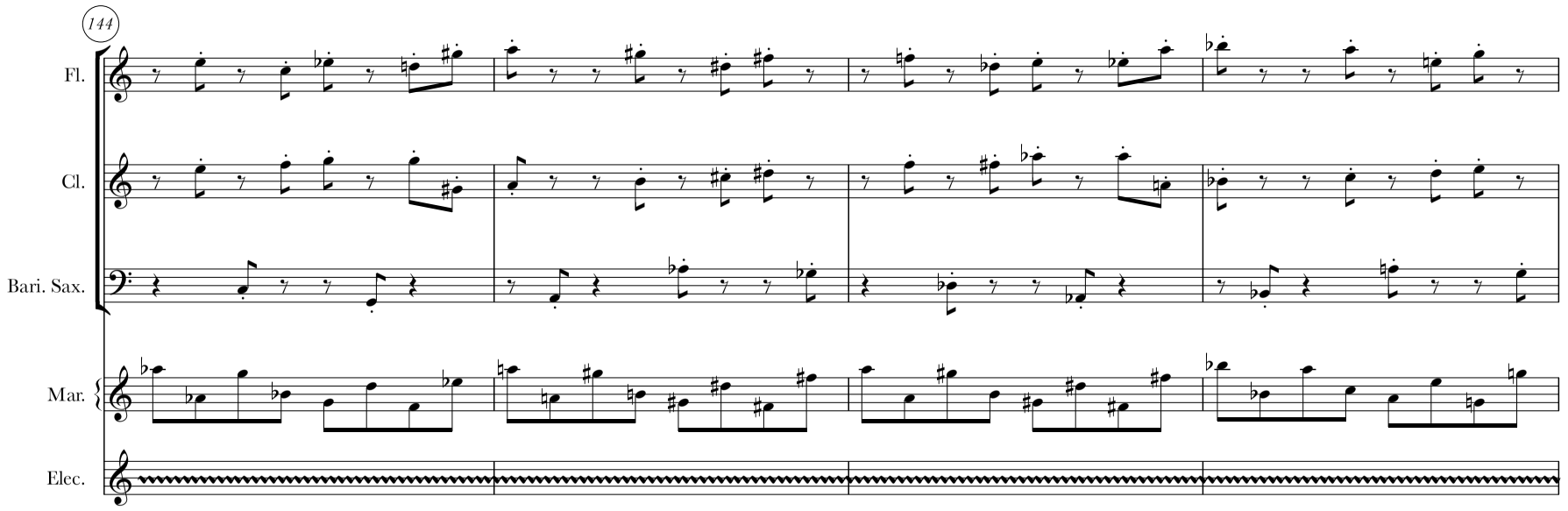

124
Fl.
Cl.
Bari. Sax.
Mar.
Granular stuff
Elec.

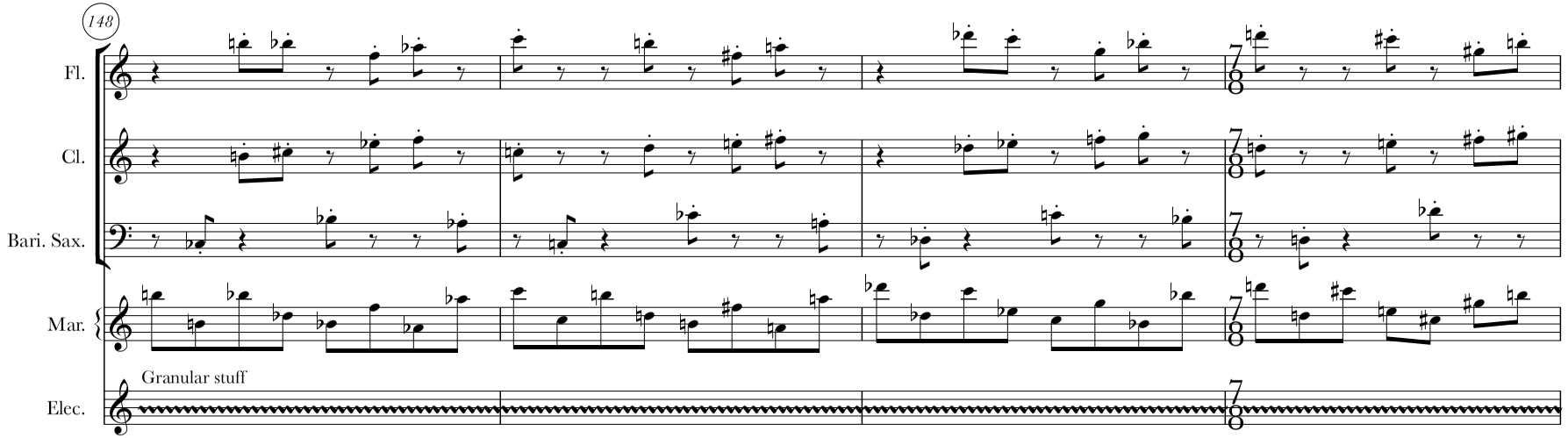
103

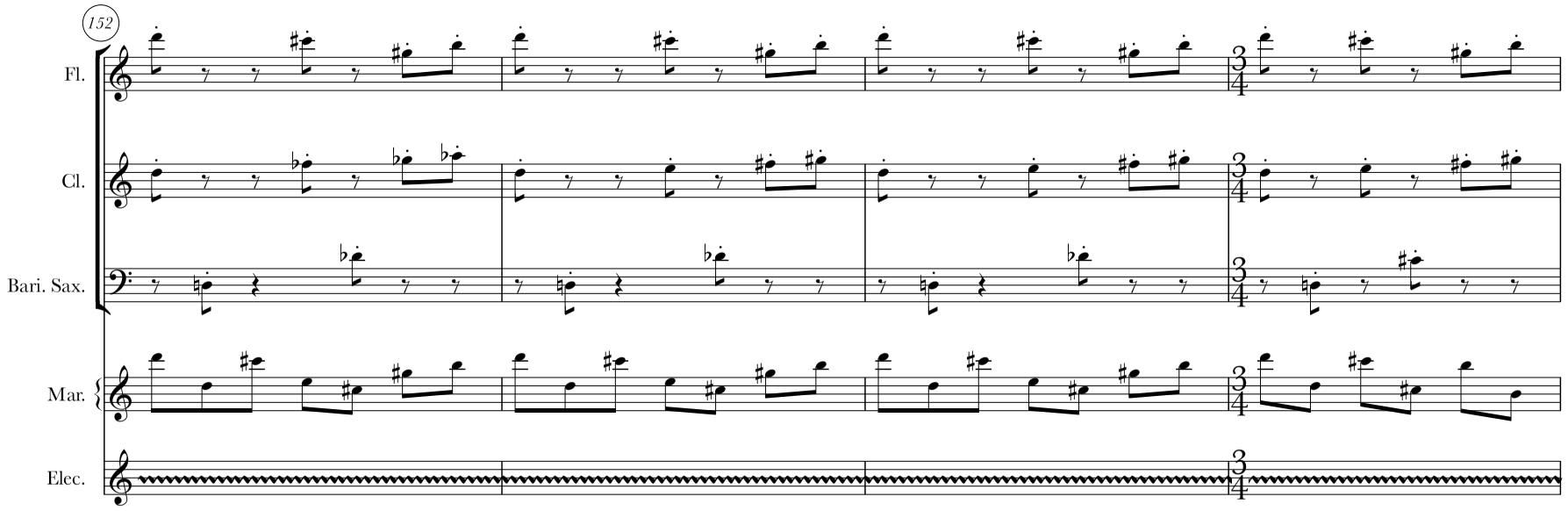

128
accel.
Fl.
3
Cl.
3
Bari. Sax.
Mar.
Elec.

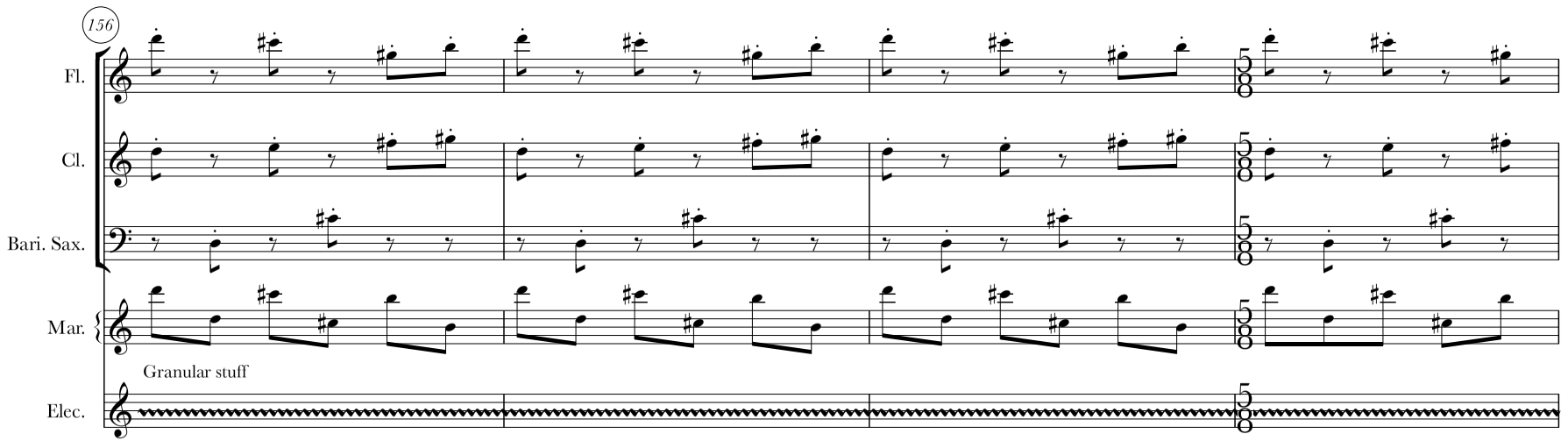

132
Fl.
Cl.
Bari. Sax.
Mar.
Granular stuff
Elec.
104
136
♩ = 160
Fl.
Cl.
Bari. Sax.
Mar.
Elec.


140
Fl.
Cl.
Bari. Sax.
Mar.
Granular stuff
Elec.

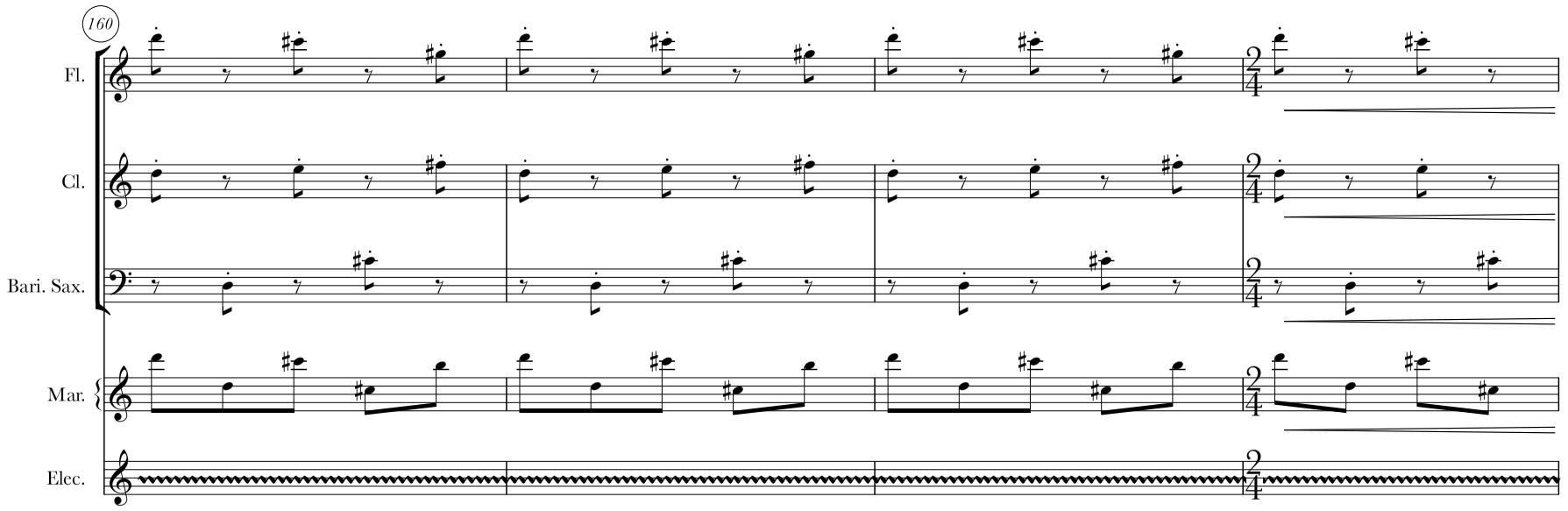

144
Fl.
Cl.
Bari. Sax.
Mar.
Elec.

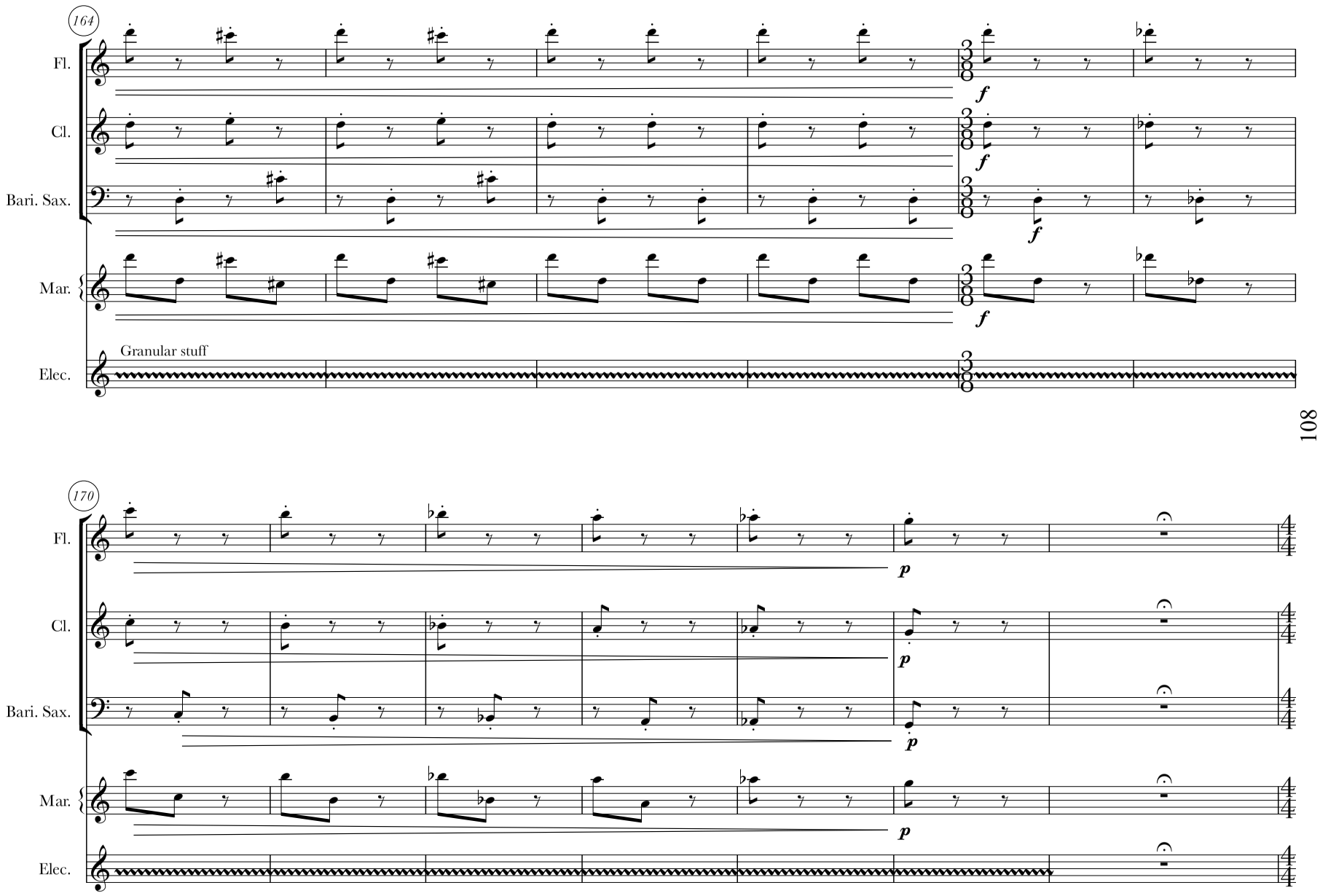

148
Fl.
Cl.
Bari. Sax.
Mar.
Granular stuff
Elec.

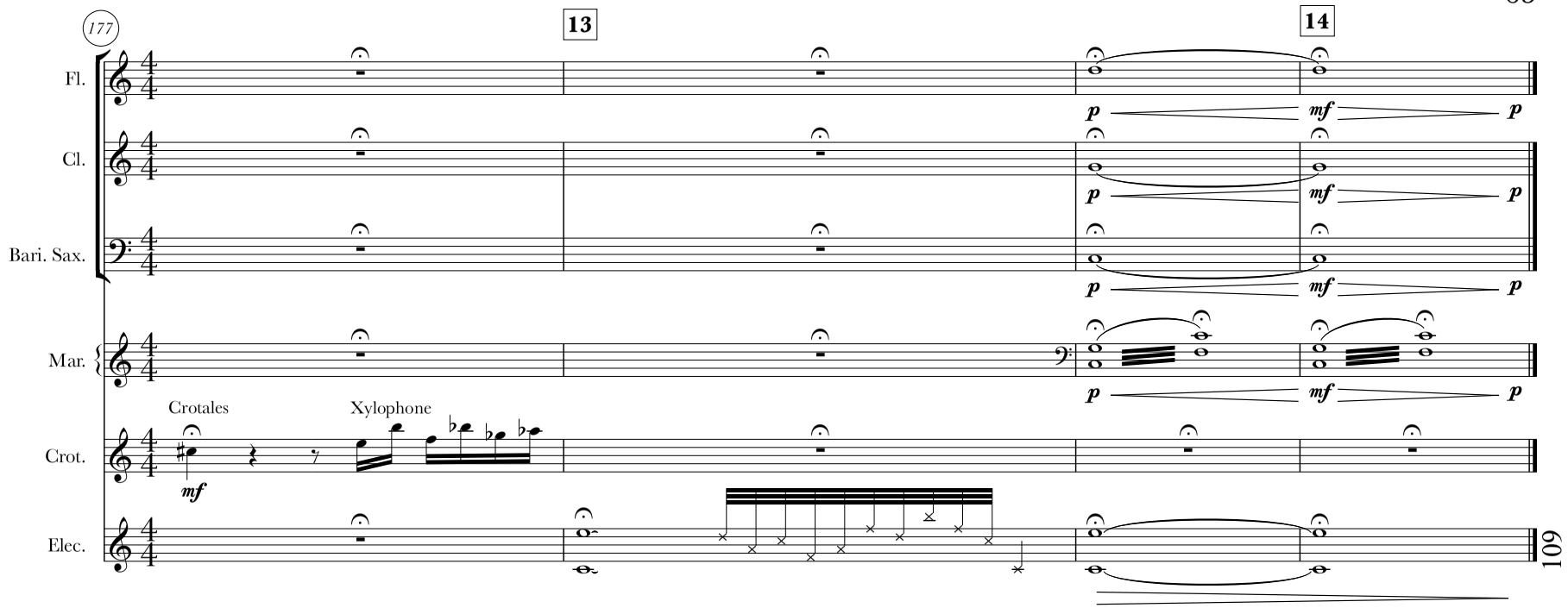

152
Fl.
Cl.
Bari. Sax.
Mar.
Elec.


156
Fl.
Cl.
Bari. Sax.
Mar.
Granular stuff
Elec.

107


160
Fl.
Cl.
Bari. Sax.
Mar.
Elec.


164
Fl.
Cl.
Bari. Sax.
Mar.
Elec.
Granular stuff
f
170
p


177
13
14
Fl.
Cl.
Bari. Sax.
Mar.
Crotales
Xylophone
Crot.
Elec.
p
mf
p
109

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Vita

Ethan Frederick Greene creates music and sound art for concert hall, stage and screen. His work explores new sonic possibilities through extended instrumental technique and electronic manipulation, with a steady focus on more traditional, often pop-influenced rhythm and harmony. Ethan has received commissions from the Houston Grand Opera, the East Coast Contemporary Ensemble, Opera Southwest, the Fountain City Ensemble, line upon line percussion, and other performers and ensembles in the U.S. and abroad. Notable honors include selections from SEAMUS, ICMC and SCI, as well as the Boston Metro Opera Mainstage Award, First Prize in the Austin Peay State University Composers Competition, and First Prize in Opera Southwest's Brabson Composers Competition.

Ethan is an avid collaborator with visual artists, choreographers, filmmakers and video game developers. Recent collaborations include *Perception Unfolds*, a new installation by renowned choreographer Deborah Hay (coming to the Blanton Museum of Art, 2014); *This American Life* (Showtime); *The Conspirator: the Plot to Kill Lincoln* (National Geographic Channel); *Night Sky*, an experimental feature film by artist Alison O'Daniel; and music and sound design for videogames *Spider: the Secret of Bryce Manor* and *Waking Mars* (Tiger Style Games). On the side, Ethan plays trumpet and melodica in the chamber-pop grump-rock band Linen Closet, and produces hip-hop and electronica tracks with various artists.

Ethan received his B.A. in Music from Amherst College (2004), M.Mus. in Composition from Rice University (2009), and is a D.M.A. candidate in Composition at the University of Texas at Austin. Principal teachers include Russell Pinkston, Bruce

Pennycook, Yevgeniy Sharlat, Arthur Gottschalk, Karim Al-Zand, Kurt Stallmann, and Eric Sawyer.

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This dissertation was typed by Ethan Frederick Greene.